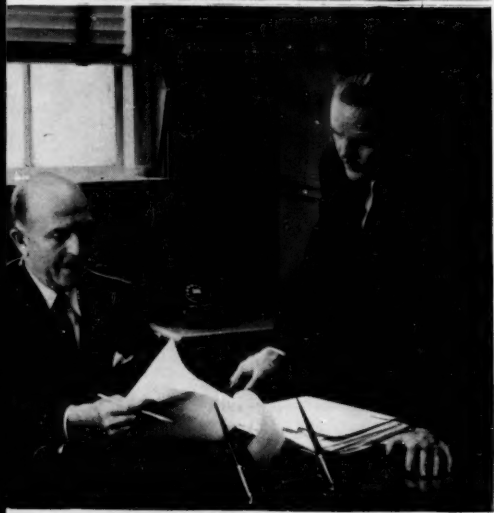


C W Report

Chemical Week

November 3, 1956

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Swelling demand from home and farm looms large in pesticides' \$1-billion sales outlook . . . p. 53

Ike or Adlai?—Democratic or GOP Congress? In any case, there'll be changes for industry p. 20

▶ Foreign operations call for special savvy. Here's Pfizer's formula for sparking international sales . p. 40

▶ UBS's Atwood and Earle: their polystyrene emulsions aim to level out the polish-makers' cost curve . p. 92

The battle's on among cooling tower experts: Is treated wood worth the extra cost? . . . p. 126

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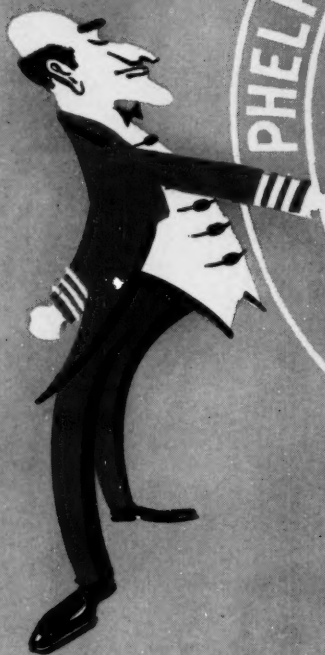
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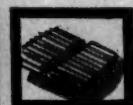


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Chemical Week

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November 3, 1956

Industry gets its first look at Reichhold's earnings story,
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November 3, 1956

Vol. 79, No. 18

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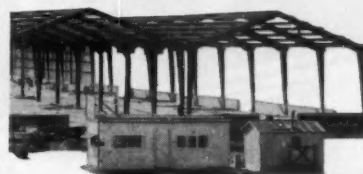
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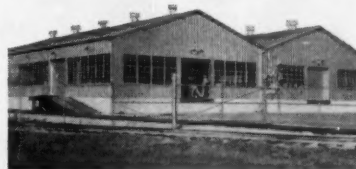
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- **RCI phenol** — whether you make weed killers or use phenol in manufacturing engine oil additives, Reichhold can make fast delivery via drum or tank car wherever your plant is located.
- **RCI plasticizers** — play a major role in the performance of many vinyls, including those used for auto upholstery and seat covers. (Incidentally, as shown in our illustration, a "retired" vinyl shower curtain can be sewn up into a fine big bag for jobs like collecting leaves.)
- **RCI polyester resins** — combine with diisocyanate to produce polyurethane foams which are currently being tried out for many types of padding such as that required in sports equipment. Other RCI polyester resins provide the sturdy lightweight protection expected of modern football helmets.

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In kettles like these — RCI is now producing its new line of aromatic solvent-soluble melamine-formaldehyde resins which give many improved properties to baking enamels for automobiles, appliances and other products.

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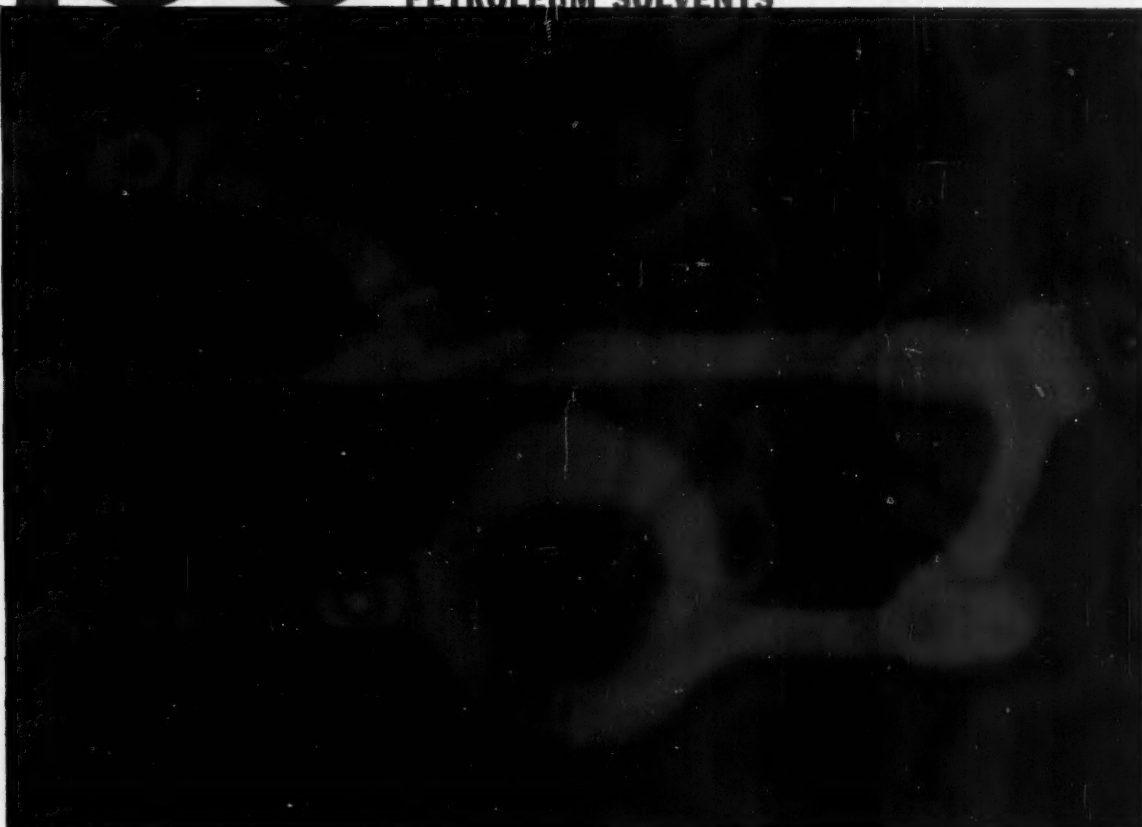
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OPINION

New York Merchants

TO THE EDITOR: We note that the catalog and company directory section of your latest **CHEMICAL WEEK BUYERS' GUIDE** lists Columbus, O., as the headquarters office for Merchants Chemical Co. Inc., and omits the New York address.

While Columbus is a new office for us, the headquarters is still at 60 East 42nd St., New York 17, N.Y. . . .

JAMES K. WALTHEN, JR.
Vice-President
Merchants Chemical Co., Inc.
New York

Chemists' Club Library

TO THE EDITOR: The Library Committee of The Chemists' Club hopes that you will find space [to tell your readers of] . . . its 1956-57 campaign for funds to continue the service and expansion of the library.

The widespread services of the club library have been of outstanding value to the individual chemist and the industry as a whole. Industrial interest ranging from the research worker to patent and commercial development studies has, over the years, made fruitful use of The Chemists' Club facilities and experienced staff.

A new booklet describing the facilities and services of the library is available. Interested parties may obtain copies by writing or phoning The Chemists' Club library.

Your cooperation will be of invaluable assistance in initiating our drive.

JOHN J. MISKEL
Library
The Chemists' Club
New York

We're glad to publish Reader Miskel's letter. The Chemists' Club library has been of inestimable value to industry, and therefore deserves industry's unstinted support.—Ed.

Burn-Up vs. By-Products

TO THE EDITOR: It may be that my reasoning powers just aren't geared to the atomic age, but the economic enigma mentioned in your story on Britain's Calder Hall (*CW*, Oct. 20, p. 74) seems inconsistent with good old machine-age logic. With plutonium valued at \$14 to \$28/gram, how can the atomic industry afford not to take

it into account when pricing nuclear power?

Certainly the American chemical industry wouldn't be where it is today had it been one to turn up its nose at a profitable by-product. For that matter, why aren't nuclear power plants in this country planning to take advantage of by-product plutonium to mitigate the exorbitant fuel costs that you predicted in February (*CW*, Feb. 4, p. 50)? An explanation in horse-and-buggy terms would be appreciated.

JAMES P. SMITH
San Francisco, Calif.

Nuclear economics, like nuclear engineering, is a complex subject. Chemical reprocessing of spent fuel often costs more than recovered by-products are worth; but it's a necessary operation to conserve scarce nuclear fuel. Goal of U.S. atomic energy planners is a reactor system that will burn fuel more efficiently, thereby eliminating the need to recover negligible amounts of unburned material.—Ed.

Tariffs and SOCMA

TO THE EDITOR: . . . Tariff matters are a very significant consideration of our industry . . .

May I thank you for having so well treated in your publication (*Sept.* 29) the work of SOCMA in the field of tariff administration, through its customs committee. . . .

JOHN M. FASOLI
American Cyanamid Co.
Bound Brook, N.J.

Brown Is Right

TO THE EDITOR: It amazes me sometimes how speedily your magazine gets the news into print. The recent sales clinic of the Salesmen's Assn. of the American Chemical Industry was scarcely a day old when the Oct. 20 issue was plunked on my desk. I

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to:
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(Chemical Manufacturers know the feeling)

HOLE in ONE



Research chemists anticipating a long series of experiments are elated when they "hit it right" the first try.

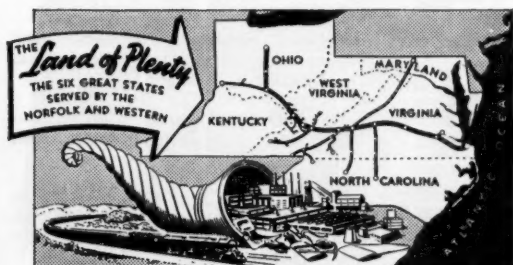
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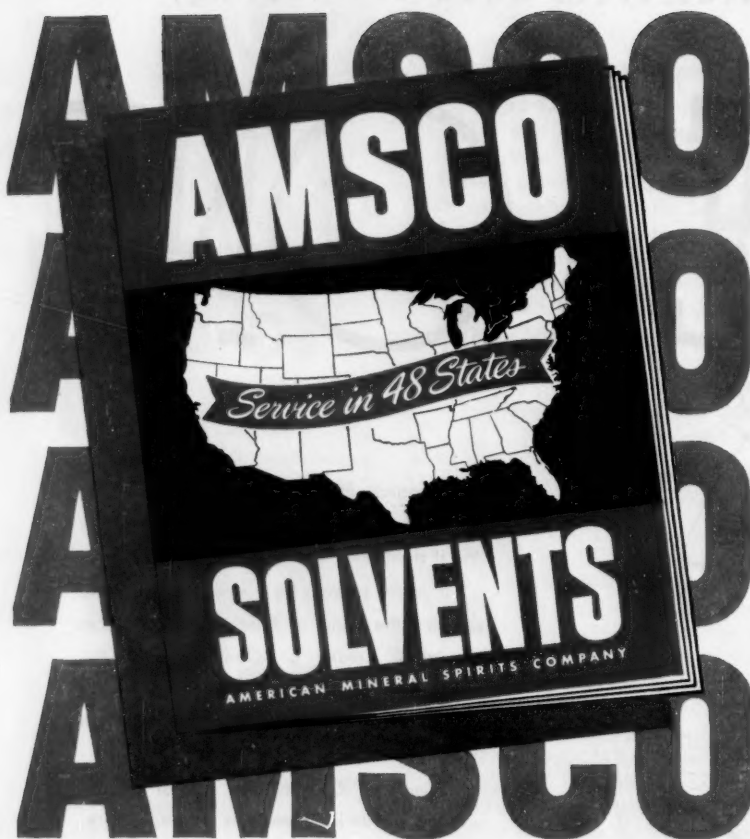
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OPINION

certainly appreciate getting the news fresh.

I think the points raised by Werner Brown are vital ones to any salesman selling today. Even if, as he says, only 10% more business results, daily planning is certainly worthwhile. I think almost all salesmen could heed his advice. Just a few minutes a day of careful planning is all that's needed to avoid wasted calls, poor presentation and inopportune timing. Daily planning is a must for all salesmen. Brown's speech should be a must on the reading list of all in the marketing organization, especially fledgling salesmen.

ROBERT CRINDER
Yonkers, N.Y.

MEETINGS

Scientific Apparatus Makers Assn., midyear meeting. The Homestead, Hot Springs, Va., Nov. 7-10.

National Paint, Varnish and Lacquer Assn., annual convention, Statler, Ambassador and Biltmore Hotels, Los Angeles, Nov. 12-14.

Chemical Market Research Assn., theme: New Tools for Market Research; Harvard Business School, Cambridge, Mass., Nov. 13-14.

American Public Health Assn., 84th annual meeting, discussions of radioactive waste disposal, water resources policies, air pollution; Convention Hall, Atlantic City, N.J., Nov. 12-16.

National Agricultural Chemicals Assn., Mellon Institute, Pittsburgh, Nov. 16-17.

Manufacturing Chemists' Assn., midwinter conference, Statler Hotel, New York, Nov. 20.

American Rocket Society, 11th annual meeting, Henry Hudson Hotel, New York, Nov. 25-30.

American Institute of Consulting Engineers, annual dinner, Waldorf-Astoria, New York, Nov. 27.

American Chemical Society, 9th National Chemical Exposition, Cleveland Public Auditorium, Cleveland, Nov. 27-30.

Armour Research Foundation and others, International Ozone Conference, Hotel Sheraton, Chicago, Nov. 28-30.

Air Pollution Control Assn., semiannual meeting, Rice Hotel, Houston, Dec. 3-5.

Society of the Plastics Industry, Inc., 7th film, sheeting and coated fabrics division conference, Commodore Hotel, New York, Dec. 4-5.



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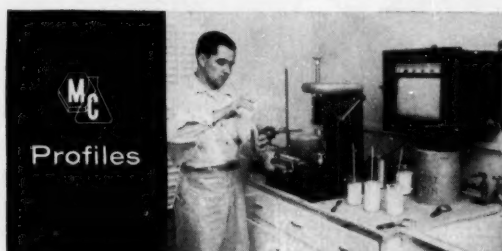
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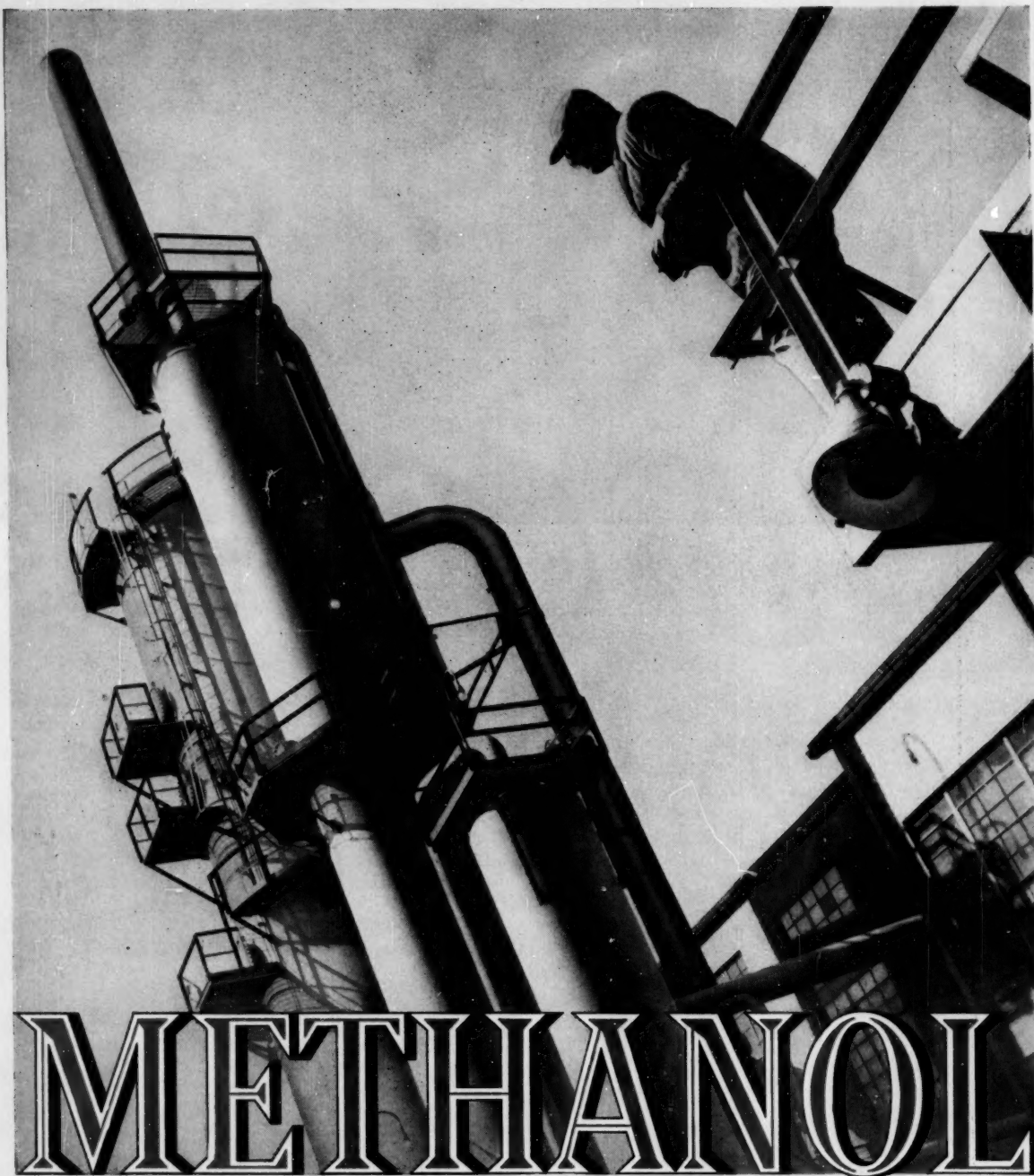
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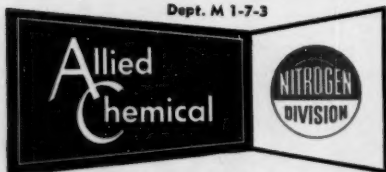
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CHEMICAL PROGRESS WEEK — APRIL 23-28 — A Better America Through Chemical Progress

Ethanolamines • Ethylene Oxide • Ethylene Glycols • Urea • Formaldehyde • U. F. Concentrate—85 • Anhydrous Ammonia • Ammonia Liquor • Ammonium Sulfate • Sodium Nitrate • Methanol • Nitrogen Solutions • Nitrogen Tetroxide • Fertilizers & Feed Supplements

Business Newsletter

CHEMICAL WEEK
November 3, 1956

Heyden Chemical and Newport Industries will merge if current discussions between the companies' managements hit no insurmountable difficulties. The combined firm would be known as the Heyden-Newport Chemical Corp.

The merger would be effected by an exchange of 1.5 shares of Heyden stock for each Newport common share. On the basis of stock prices just before the companies publicly admitted that they were negotiating, Heyden will issue stock worth over \$16.2 million for Newport's common. There's no decision yet on arrangements about Newport's 4¼% cumulative preferred stock.

Why did the firms decide to merge? To Heyden, Newport is valuable for its basic position in tall oil and rosin. To Newport, Heyden's substantial cash holdings would form a ready source of capital to exploit Newport's growth potential. Too, both companies sell many products to a single market—protective coatings.

Report Heyden's Simon Askin and Newport's Armin Schlesinger: "Both managements are convinced that the combined firm has a substantial growth and earnings future."

Rohm & Haas, too, is conserving capital for growth purposes. This year, as it has in the past, it will pay a stock dividend to holders of its common stock. But this year, this dividend will be 3%, not 4%. Reason: the increase in price of the company's common stock.

The fair market value of a 4% dividend, when added to the cash dividends paid, explains Board Chairman Otto Haas, "would have been substantially larger than the estimated earnings for the year 1956."

Olin Mathieson's E. R. Squibb Division will move out of Brooklyn, where it has been operating for 98 years. During the next 18 months to two years, Squibb will move most of the production (now carried on in the 13-building complex at one end of the Brooklyn Bridge) to New Brunswick, N. J., where it now has research and biological division production facilities.

The company considers the present plant antiquated. It will offer the 1,000-plus workers comparable positions at New Brunswick, where it hopes that profit margins will be more nearly adequate. Squibb expects to build new facilities there to house activities being transferred from Brooklyn.

Antitrust proceedings were filed against one process-industry firm this week, and similar suits may be ahead for others.

Minnesota Mining & Manufacturing was accused, in a suit filed in Federal District Court in Newark, N. J., this week, of exercising

Business

Newsletter

(Continued)

monopoly powers in regulating terms of sale and resale of Scotchlite reflecting sheeting. In 1955, 3-M made more than \$10 million worth of Scotchlite products. The Justice Dept. seeks court orders to lift present 3-M restrictions on use and resale of such materials.

Meanwhile, a Justice Dept. attorney has told Continental Can that it plans to file an antitrust suit challenging Continental's merger with Robert Gair Co., as it did when Continental merged with Hazel-Atlas Glass.

And talk persists that the government will seek to block the proposed merger of International Paper and Long Bell Lumber (*CW*, Sept. 15, p. 28). Final vote on the merger is expected on Nov. 5.

The water situations that have plagued chemical process firms are somewhat better this week. Ten days ago, the level of the water in the Mississippi at the lower end of the Alton, Ill., barge locks was just 7 ft. (*CW*, Oct. 27, p. 23), but last weekend, barges with 7.5-ft. draft were getting through. Rains in Texas' Neches River valley have been enough to postpone—for two weeks—a proposed 56% cutback for industrial users in the Beaumont area (*CW*, Oct. 27, p. 24). In the Pacific Northwest, the Bonneville Power Administration will restore normal hydroelectric service to 300,000 kw. of interruptible industrial power loads beginning Nov. 1. Reason: improved streamflows.

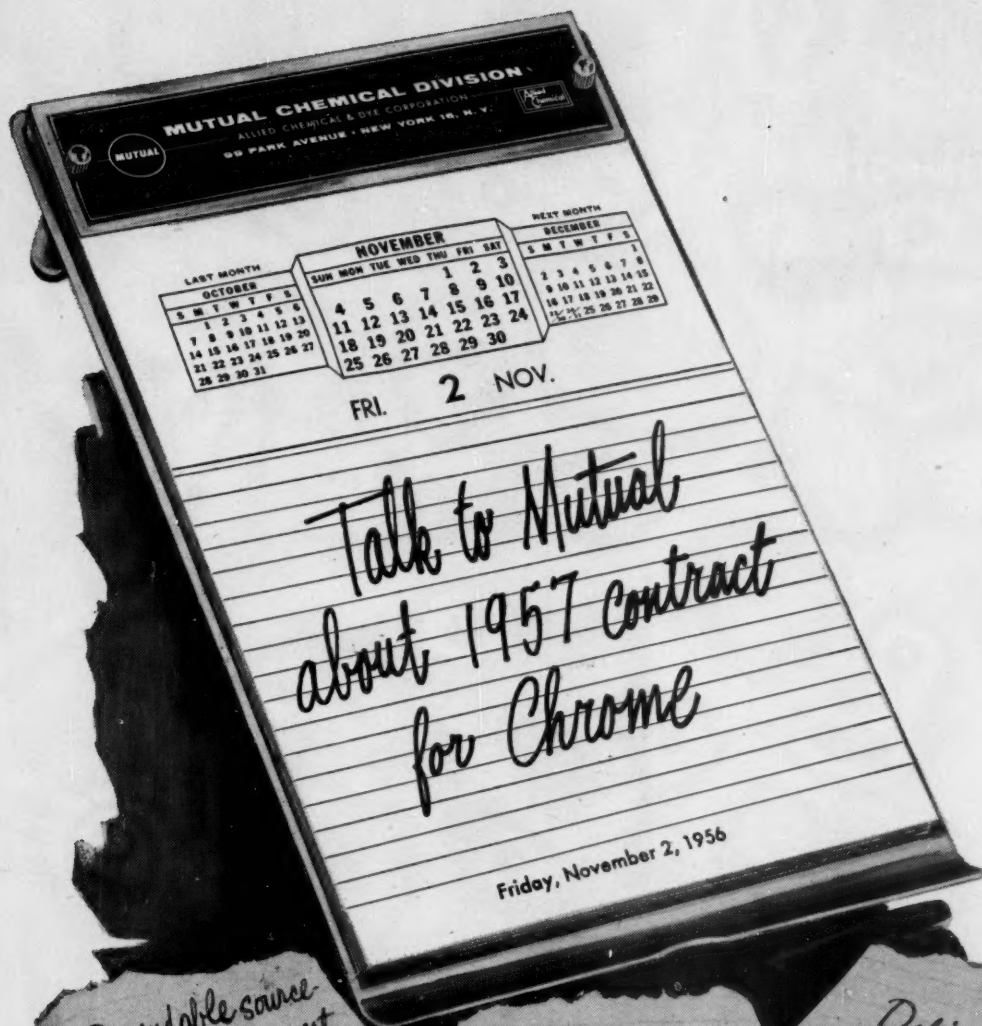
Minor Memos—New Jersey Zinc has taken up its purchase option for land at Ashtabula, O. There's no indication yet as to what type of plant it will build—though the firm has raised production of titanium tetrachloride to 10 tons/day at its Palmerton, N. J., pilot plant.

Look for another firm to change its name to reflect its chemical interests. Within two or three years, Dayton Rubber may become Dayton Rubber & Chemical. It thus joins Pennsylvania Salt Mfg. Co. (*CW Business Newsletter*, Oct. 27), which, next year, is slated to become Pennsalt Chemicals, Inc.

Will Canada have a new "chemical valley" like the one at Sarnia? Reports are circulating that the Bronte area of Ontario (between Toronto and Hamilton on Lake Ontario) may see similar development. First plant: a \$20-million refinery.

Wall Street is talking about that 10% of Celanese Corp.'s common stock that was held by the late Camille Dreyfus. Streeters expect purchase of the stock by another chemical firm or by an outside company wanting to get into chemicals.

Plastic won't replace cork as a stopper for expensive champagne. In a recent competitive testing, a group of expert tasters identified just about every bottle of the beverage that used a polyethylene cork. The test might have pointed the way to extensive use of the plastic to replace the expensive eight-section cork closure.



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ALLIED CHEMICAL & DYE CORPORATION

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November 3, 1956

Chemical — Week

As election day approaches, businessmen are wondering what the voting will mean to their business. Here's CW's last-minute report on . . .



The Chemical Angles in Next Week's E

In evaluating what next week's balloting will mean to your company, look at the impact that the election of Eisenhower or Stevenson will have on the rest of U. S. government.

Look, and consider the three possible results from the Nov. 6 vote—re-election of Eisenhower as President with a Congress controlled by the Republican party; or with a Democratic Congress; or election of Stevenson as President with a Democratic Congress.*

*Omitting, of course, the statistical possibility of a Democratic President with a GOP Congress.

Evaluate each of these in the light of the campaign issues that are especially significant to business:

Money and Credit—You could expect Stevenson to loosen somewhat the "tight money" policy that Eisenhower's economic aides and the Federal Reserve Board favor as a weapon against present inflationary tendencies in the U.S. economy.

With an Eisenhower election, business will continue to have difficulties in getting credit. The "tight money" policy might last many years if business keeps wanting to build as many

new plants as it does now and if there is no substantial downturn in business prosperity.

While Congress sets the framework under which credit policy is determined, it has little to say about day-by-day operations.

Corporation Taxes—There's virtually no chance of a cut in the present 52% tax rate if current levels of business activity continue. There is a good chance, though, that many so-called "technical" tax changes will be made during 1957. There will be a lot of smoke—but not much fire—on "big



BLACK STAR



WIDE WORLD

s Election

business tax give-aways" if the Democrats control Congress. Attempts might be made to repeal those sections of the 1954 tax law which allow businessmen the privilege of depreciating new plants at faster than "straight line" rates, and which gives investors a tax credit on dividends. Chances are slim that either attempt would be successful. Congress is, by and large, conservative in its attitudes. But if Stevenson is elected, the odds against repeal of current depreciation and dividend laws would not be quite as high.

Small Business—There's a real likelihood that 1957 will see new tax laws written to help small businessmen. There are many proposals, but perhaps the one most likely to be enacted is one that would reduce corporation taxes on a business's first \$25,000 of net income. A Democratic congress would be more liberal on this score.

Government Spending—The federal budget will go up next year, no matter who is elected President, no matter who controls Congress. If your company has defense contracts, don't worry about any across-the-board cuts in military spending.

With Stevenson in the White House,

federal welfare spending would go up faster than with Eisenhower as Chief Executive.

Individual Taxes—Because military spending will stay at a high level, there won't be much of a budget surplus in '57. A cut in income tax rates is therefore unlikely. But tax experts do see the possibility of a tax cut for individuals in '58.

The Republican position on individual cuts is that they should be made by reducing percentage rates; Democrats contend that exemptions from taxable income should be raised.

Foreign Policy—Stevenson has promised, if elected, to formulate a bolder, more dramatic foreign policy.

Chemical Caps in the Ring



Hercules' McConnell

MANY businessmen trying to figure out how conditions will be after the election are candidates themselves.

A just-completed *CW* survey of major chemical firms turns up this list of office-seekers with aspirations ranging from state governor to city councilman:

J. H. Tyler McConnell, executive secretary of Hercules Powder Co., is the Democratic candidate for governor of Delaware. He is a descendant of President John Tyler, and grandson of James Hoge Tyler who served as governor of Virginia from 1898 until 1902.

Hugo Riemer, president of Allied Chemical & Dye's Nitrogen Division, is running for city councilman in New Providence, N.J.

Harry A. Hook, fire inspector at Merck's Rahway plant, seeks office as councilman in Rahway, N.J.

Dr. R. F. Varney, head of E. R. Squibb & Sons' biological control department, is campaigning for councilman in Highland Park, N.J.

Peter Bartsas, of American Potash's Henderson, Nev., plant, is running on the Republican ticket for the state assembly.

Aubrey Pagan, also employed by Ampot at Henderson, is running for re-election as Henderson Township constable.

Edward Tiller, area supervisor at Du Pont's Newark, N.J., pigments plant, is running for mayor of Garwood, N.J.

John P. Davidson, office manager in the same plant, is a candidate for Chatham Township, N.J., councilman.

Leon Paul Genecki, of Du Pont's Parlin, N.J., plant, is a Republican candidate for freeholder of Middlesex County.

Donald C. Boughten, senior research scientist in Du Pont's Grasselli Chemicals Dept., is candidate for the Pennsylvania state legislature.

Henry H. Wolf, Grasselli Chemicals Dept. sales control manager, is running for the Delaware legislature.

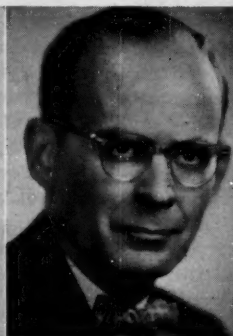
James H. Snowden, Du Pont textile fiber market researcher, is also seeking office in the Delaware legislature.



Allied's Riemer



Merck's Hook



Squibb's Varney



Du Pont's Genecki

Such a policy would also mean new foreign economic policy, which would directly affect most businesses.

On carrying out foreign policy and foreign economic policy, Eisenhower and Stevenson would have about the same record. In getting his policies written into law by Congress, each would have his troubles. The Democratic party is no longer one of strictly "free trade," the Republican view is not always one of protectionism. Since both Eisenhower and Stevenson lean toward free trade, the success that either would have in getting Congress to go along with him depends on the success he would have in keeping his party in line. Look for more trade liberalizing with Eisenhower and a Republican Congress or Stevenson and a Democratic one, less success if Eisenhower must work with the Democrats.

Tariffs—Since the reciprocal trade act comes up for renewal in '58, tactics for getting it extended or for getting more limits put into it are already being decided. There's little question that it will be renewed—it's just a matter of how broad its provisions will be. There will be another push for Congressional approval of the Organization for Trade Cooperation; if it isn't approved in '57, OTC is dead.

Odds for approval are better than they were, since its proponents can argue that if the U.S. doesn't join OTC, it may find that European countries will form their own trade zone (*CW*, Oct. 27, p. 21), which, perhaps, would bar the U.S. from competing for European markets.

Minimum Wage—If Stevenson is elected, the prospect of an increase in the minimum wage from \$1 to \$1.25 per hour is possible. Eisenhower and a Republican Congress would likely broaden coverage to now-exempt industrial groups. Eisenhower and a Democratic Congress would most likely broaden coverage.

Taft-Hartley—Eisenhower's re-election would effectively block repeal of the Taft-Hartley law, though amendment of it is possible. A victory by Stevenson would shift the balance more toward the view of organized labor—but not as much as labor leaders hope.

Transportation—Look for a real push, if Eisenhower is returned to office, for laws to implement the

recommendations of the Cabinet transportation policy committee. These recommendations, familiarly known as the "Weeks Report," generally favor railroads over truckers. Stevenson is not especially vocal on the subject.

What will Congress do? Generally, the trucking interests have done better than the rail men in putting their point across.

Voting on these matters always cuts across party lines, so an accurate forecast is difficult to make. But chances are dim that either a Democratic or Republican Congress will adopt any new, controversial legislation in this field.

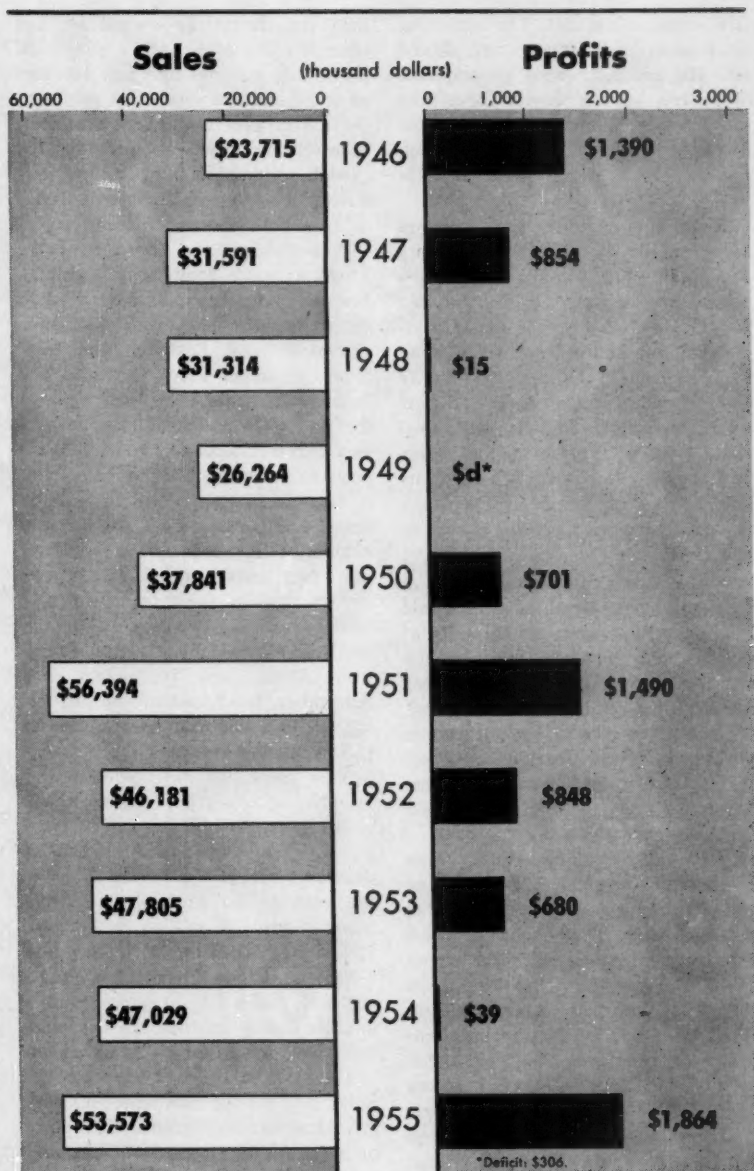
Other Matters—There are many other kinds of legislation in which chemical process industry firms have a real interest. Among such subjects: mineral leasing policies, food additive and cosmetic chemical regulation, water and air pollution research and control, industrial alcohol regulation, offshore oil, gas and sulfur problems. These matters are not likely to be affected by the coming election. On technical matters such as these—where there's no strong pressure from a legislator's constituents—Congressional action is relatively nonpartisan. And it may be a long time coming.

Taste of Fluoridation

One of the many evils of fluoridated water cited by its detractors is an alleged bad taste. Combining a little promotion with a little inquiry, McGill University (Montreal, Can.) showed recently that the fluoridation taste is rather less than unbearable for most people.

At its dental school's open house, two drinking fountains were set up. Visitors were asked to drink from each, tell which one, if either, was fluoridated. The first day, both fountains flowed only plain tap water. On the second and third days, fountain "A" ran water fluoridated at 2 parts per million; fountain "B" ran tap water. Each of the three days, about 30% of the visitors thought "A" was fluoridated, 32% thought "B" fluoridated, 37% tasted no difference.

Another part of the exhibit, which showed the tooth-decay preventive effect of fluoridation, persuaded 1,065 people to sign a petition asking for fluoridation of Montreal's water supply.



Reichhold Bares Its Books

U.S. businessmen are this week getting their first close look at the story of Reichhold Chemicals.

Reason: the 26-year-old, privately held corporation is readying a public offering of 200,000 shares of common stock, the first sale of its kind the company has made. President Henry Reichhold has been swinging through the country, answering questions put by prospective investors, queries about sales and earnings (see chart) and

about future prospects for the company.

For Reichhold, aside from proceeds neighboring \$5 million, the offering may well be a sound barometer for measuring the firm's chances of getting a permanent listing on the New York Stock Exchange. Public ownership has been cited frequently as a goal of the company, was one of the advantages Reichhold had hoped to gain through merger with Catalin Corp.

(*CW*, Sept. 15, p. 52). The upcoming stock issue, Wall Streeters say, should give the company wide geographical ownership, should provide more than the 2,500 stockholders required for Big Board listing; current speculation sets per-share asking price at \$22-\$27.

Right now common stock holdings are primarily in the hands of Henry Reichhold; of the 1 million shares now outstanding, he owns 876,300. Another 26,400 are spread among the remaining directors and officers, while some 97,300 belong to the Reichhold family and other associates. After the new issue, Reichhold himself will own about 74% of the 1.2 million shares outstanding. Moreover, it's said, as public ownership progresses, he'd like to reduce his holdings to something like 25%.

The Record: A casual glance at Reichhold's sales-earnings chart would not excite most investors. In spite of a reasonably smooth sales growth curve, the company's earnings record looks rather erratic. But, of course, the picture of company growth under the aegis of private ownership and personal direction can look far different from that when the company reports to a widespread public ownership.

Thus, Reichhold's growth has been based largely on earnings—the company's total long-term debt stands at a conservative \$9 million on which principal payments will run about \$500,000/year over the next five years. Last year, the company paid \$333,000 in interest. Net operating income for 1955 was \$3,457,000; for the first eight months of 1956, it was \$2,014,000. Net income last year was 16.8% of plant investment, while the company showed 11% return on net worth.

In sales, Reichhold has had fairly steady increases over the past 10 years, except some peaks and valleys from 1949 through 1951. Again, however, observers point out that Reichhold has in many cases been the industry price leader on items it makes. The 1952 figures, particularly, resulted from a flurry of such cuts.

The Future: There's not much doubt that the future holds interesting highlights for the firm. Listing on the New York Stock Exchange would mean considerable change in managerial outlook as the company turns to a public-ownership philosophy. Because the

firm was essentially owned by one man, it could plow back a substantial portion of earnings into new facilities or could sacrifice short-term profits to get longer-term unit sale gains. But, observers point out, in continuing the growth policy of its past, the firm may have to be more conservative—as far as fiscal policy is concerned.

Nonetheless, the horizon looks broad to some prospective investors. For one thing, they look at Reichhold's recent arrangement with Escambia Chemical (*CW Business Newsletter*, Sept. 29) under which Escambia will build a methanol plant, sell most of the output to Reichhold for conversion into formaldehyde. Reichhold expects to sell some \$100 million worth of such formaldehyde in the next 10 years. The contract does not have an expiration date; cancellation would require two years' notification.

As a result of the agreement Reichhold is planning two new 35-million-lbs./year formaldehyde plants at Detroit, Mich., and Tuscaloosa, Ala. Altogether, Reichhold will be processing to formaldehyde some 10% of U.S. methanol capacity.

This alone would provide strong incentive to many buyers, but Reichhold's not stopping there. The company, at Tuscaloosa, will increase its pentaerythritol capacity from 4 million lbs./year to 10 million, its phenol capacity from 50 million lbs./year to 75 million. The company intends also—through license agreements with Devco & Reynolds Co. on epoxy resins—to enter heavily into tooling and structural plastics, and structural adhesives.

The new stock issue marks a decisive step for the company. But with prospects looming bright, and plans on the board for substantially increased capacity, the company is looking to even better days. As Henry Reichhold sums it up: if the present rate of business continues, even further expansion will soon be needed.

New Light on Mergers

Merger of two unions doesn't invalidate a labor contract, but merger of two companies with adjacent plants can lead to an election to determine which of two unions will organize both plants.

Last week, the National Labor Relations Board, in further clarifying its policy on what is to happen following

mergers, favored a petition submitted by Hooker Electrochemical. NLRB's last precedent-setting decision also involved a chemical firm—Union Carbide.

In the earlier case, NLRB ordered the company to bargain with a union formed by the merger of two others (*CW*, Aug. 25, p. 20). This time, the board, over objections of two unions, has ordered a single bargaining election to cover production, maintenance and service employees at Hooker's original Niagara Falls plant and at the nearby plant acquired when Niagara Alkali was merged into Hooker. NLRB, by a 4-0 vote, ruled that where operations of several plants become integrated under centralized managerial control—as in this case, following a merger—stable labor relations are best served if the employees of both plants are included in a single collective union group. The AFL-CIO Oil, Chemical and Atomic Workers represented Niagara's production and maintenance workers, and an independent union—Niagara Hooker Employees Union—was bargaining agent at Hooker's original plant.

EXPANSION

Ammonium Phosphate: Anaconda plans a \$1-million expansion of its ammonium phosphate fertilizer capacity at Anaconda, Mont.

Nylon: Chemstrand will increase its nylon capacity at Pensacola, Fla., to 114 million lbs./year—more than doubling current capacity. Completion is scheduled for 1958. First step—to 88 million lbs./year—will cost the company \$43 million.

Pulp: Waldorf Paper Products Co. will build a \$6-million unbleached pulp mill near Missoula, Mont. Capacity: 250 tons/day.

Cement: Canada Cement Co. will enlarge capacity of its Woodstock, Ont., cement plant from 1.6 to 3.1 million bbls./year. Estimated cost: \$5.5 million.

Asphalt: Industrial Asphalt Co. will install four asphalt plants at various locations at a total cost of \$600,000.

Boric Acid: Stauffer Chemical will increase capacity of its San Francisco

Washington Angles »

» **A proposed executive order** allowing the Defense Dept. to close the Navy's two paint factories and other department-operated plants will be taken up at an early postelection meeting of the Eisenhower Cabinet.

Right now, a Senate directive bars such closings and the substituting of private suppliers if closing the plants would raise costs. But, the Navy's been unable to act for lack of a method to pin down comparative unit costs of private and government-produced paints.

The proposed order would get around making direct cost comparisons by allowing the Pentagon to assume that its costs would not rise if there are enough qualified private manufacturers to assure competitive bidding. And scores of firms have already said they are ready to make all Navy-type paints.

» **Will the government reject all bids** for long-term leasing of the 90,000-tons/year Louisville, Ky., alcohol butadiene plant and go back to Congress next year for permission to sell the plant? That's

the current question in Washington.

Bids under the latest 5-to-15-year lease-offer were due Oct. 31 and, barring a surprise, there will be only two—from Union Carbide and Publicker. Terms of the government's offer include both national security and recapture clauses, and it's no secret that these stipulations have depressed interest in a long-term lease and have made it unlikely that bidders will raise their initial offers to government negotiators.

So government officials are now changing tack, figure they can get more money if Congress will agree to a sale without such rigid plant-use restrictions.

» **Atomic energy's impact on coal production** won't be significant until 1975, say officials of the Atomic Energy Commission and Dept. of Interior. A solid fuels conference held by two engineering societies here last week heard predictions of a doubling of coal production by 1980, and an increase in coal demand resulting directly from use of nuclear energy in gasification processes.

boric acid plant by 50%. The \$500,000 expansion is expected to be completed in Feb. '57. Stauffer will use a portion of output to make boron oxide.

• **Manganese:** Stratmat, Ltd., a subsidiary of Strategic Materials Corp., is negotiating for electricity contracts to power a \$20-million manganese smelter near Woodstock, N.B. The mill will process 1,800 tons/day of ore, is expected to go into operation in 1957.

FOREIGN

Triple Superphosphate/Mexico: A group of Canadian investors are planning to spend about \$30 million on a zinc smelter in Mexico, which will include a new fertilizer unit. By-product sulfuric acid will be used to treat phosphate rock imported from Florida to make triple superphosphate. Reynosa, Saltillo and Tampico are possible sites for the project, which will get under way next spring.

• **N-type Rubber/Britain:** British Geon, subsidiary of Distillers Co. Ltd., is now building a synthetic rubber plant in Glamorganshire, adjacent to

other plants in the Distillers plastics group. The new unit will produce butadiene-acrylonitrile copolymers similar to those made in the U.S. by B. F. Goodrich Chemical Co.

• **Chloralkalis/Peru:** W. R. Grace & Co. is awaiting governmental o.k. for a \$5-million caustic soda plant near Huacho, Peru. The new unit will turn out 50 tons/day of caustic and equivalent quantities of chlorine. Also to be produced: soda ash, hydrochloric acid, bleaching powder, and ethyl chloride. Construction will take about 18 months.

COMPANIES

• **Canadian Industries Ltd.** has purchased the assets of Witts Fertilizer Works Ltd. (Norwich, Ont.), the second such acquisition by CIL.

• **Georgin-Pacific Corp.** has completed purchase of Hammond Lumber Co. for approximately \$75 million. G-P will sell off about \$10 million of Hammond properties.

• **Reynolds Metals** has exercised its option to buy a 4,000-acre tract adja-

cent to Lake Desmet, Wyo. The tract covers a seam of coal, over 100 ft. thick, and would be used for construction of an aluminum reduction plant.

• **Canada Cement Co.** is offering \$15 million worth of 5¼% 20-year sinking fund bonds at \$100 plus accrued interest. The offering is being made by a group headed by Wood, Gundy & Co.

• **Imperial Oil Ltd.** has registered 1,504,271 shares of capital stock with the Securities & Exchange Commission. The stock will be offered to U.S. stockholders on the basis of one new share for each 20 held.

• **Houston Natural Gas Corp.** is offering 100,000 shares of 5¼% convertible preference stock at \$100/share. Each share will be convertible into 2.9 shares of the company's common stock.

• **Northspan Uranium Mines, Ltd.,** will finance mines and mills in Ontario through a \$45-million U.S. public offering of general-mortgage bonds bearing detachable stock purchase warrants.



To Manufacturers of Pharmaceuticals-Cosmetics-Candy-Foods-Tobacco-Paint and Varnish-Resins-and Other Products

Here is your new, basic source of supply for Sorbitol Solution, the moisture conditioner or humectant that is becoming more and more important.

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Deliveries now being scheduled. Available in 55-gallon lined drums containing 600 lbs., and in stainless steel tank trucks (approximately 30-36,000 lbs.) or tank cars (85-106,000 lbs.).

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RAHWAY, NEW JERSEY



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Standards and Specifications of 70% Sorbitol Solution Merck

Physical characteristics: Clear,
clean, colorless liquid, odorless.

Polyhydric Alcohol	
Content	Min. 70% $C_6H_{14}O_6$
Total Solids	70-71%
Assay for D-Sorbitol . .	Min. 64%
Reducing Sugars	
(as glucose)	Max. 0.10%
Residue on Ignition . .	Max. 0.02%
Iron (Fe)	Max. 0.0003%
pH	6.0-7.5
Specific Gravity	
(at 25°/25°)	1.285-1.305
Chloride (Cl)	Max. 0.0050%
Sulfate (SO_4)	Max. 0.010%
Arsenic (As)	Max. 0.000075%
Heavy Metals (as Pb) .	Max. 0.0010%
Nickel	Max. 0.0005%

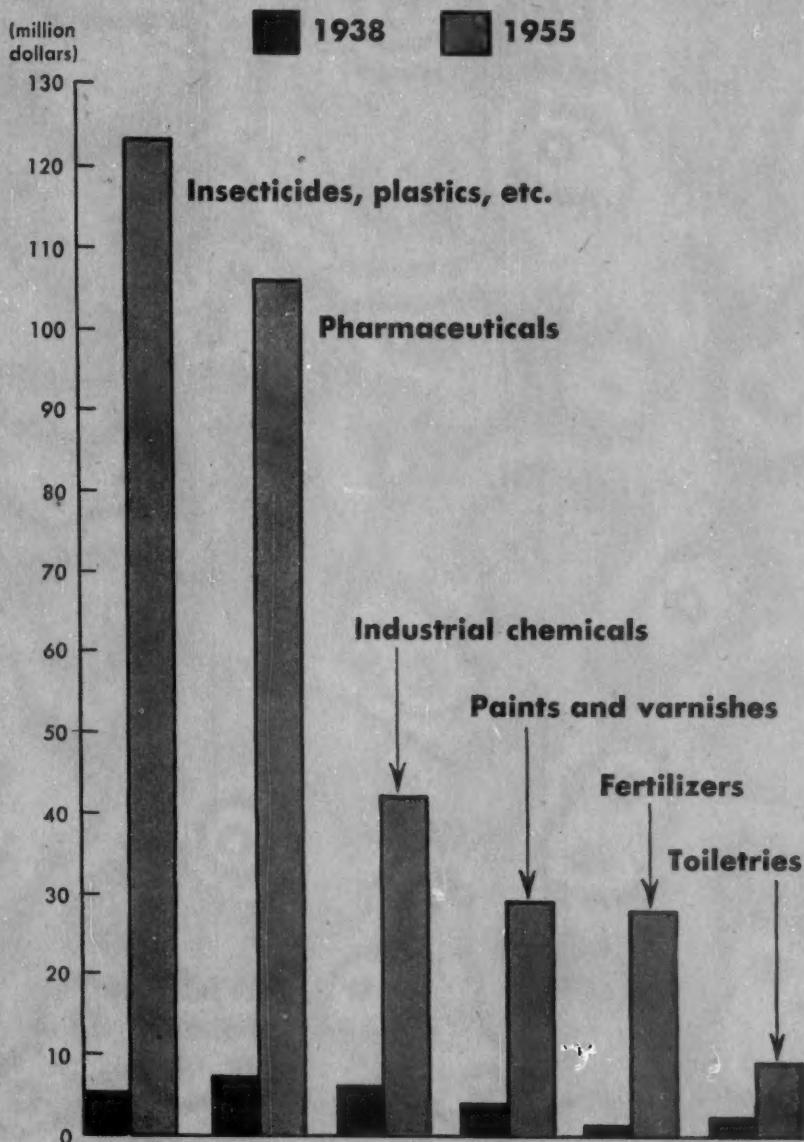
ASK FOR SAMPLE
MERCK & CO., INC. Dept. CE

Charting Business

CHEMICAL WEEK
November 3, 1956

GOOD NEIGHBORS ARE GOOD BUYERS:

Last year, Latin America bought 33% of U.S. chemical exports



Source: Chase Manhattan Bank.

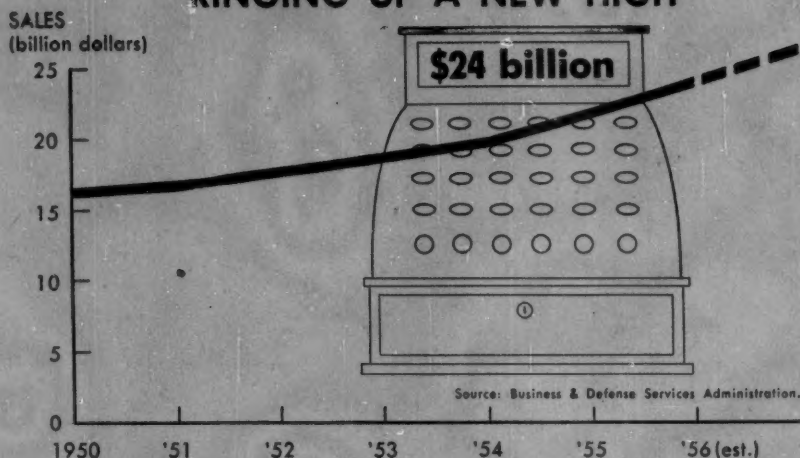
LATIN AMERICA is today one of the biggest buyers of U.S. chemicals. Last year, the republics purchased 33% (\$337 million) of all U.S. chemical exports; in '38, they purchased 22% (\$25 million of the total. Today, the U.S.

supplies 65% of Latin American chemical imports and may increase that business in the future, despite the strong bid by western Europe, especially Germany, to regain its prewar status in South American chemical markets.

Charting Business

(Continued)

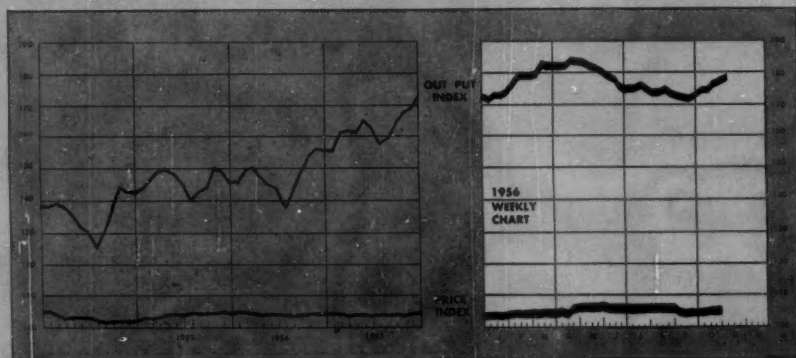
CHEMICAL SALES THIS YEAR — RINGING UP A NEW HIGH



ANOTHER RECORD will likely be chalked up this year by chemical manufacturers. Sales are expected to hit an all-time high of \$24 billion—a 40% increase over 1950 sales. Reason for this

forecast: from March through June of '56, sales exceeded \$2 billion/month. Moreover, chemical and allied products sales for the second half are keeping up with accelerated production.

BUSINESS INDICATORS

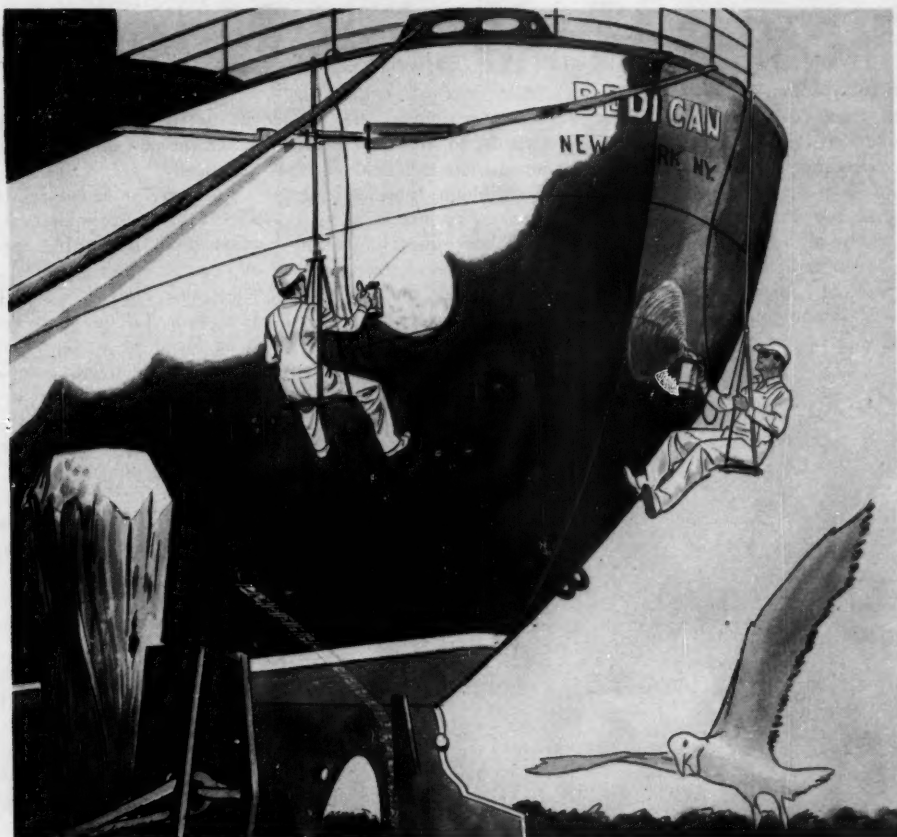


WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	180.8	178.9	168.2
Chemical Week Wholesale Price Index (1947=100)	106.0	105.8	104.7
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	441.5	442.3	443.9

MONTHLY

	Latest Month	Preceding Month	Year Ago
Production (Index 1947-49=100)			
All Manufacturing & Mining	145	142	142
All Chemical Products	174	170	171
Industrial Chemicals	186	184	190



proved corrosion resistance with wash primers

The adhesive properties of Shawinigan Resins' FORMVAR and BUTVAR are especially valuable in "wash primers." Anti-corrosion primers of this type adhere better on metal surfaces and permit better adhesion of top coat to primed surfaces. This tenacious two-way adhesion provides better protection against corrosion.

These primers or metal conditioners have other important advantages over conventional materials. They apply easier, dry faster, resist abrasion and impact, and prevent underfilm corrosion. The wash primer protective coating of only 0.3 to 0.8 mil thickness is a tough, corrosion resistant conditioner for steel, aluminum, cadmium, tin, galvanized

iron and magnesium. Formulation is easy in your regular pebble mill.

Wash primers have extended the life of metals in many applications and have opened profitable new markets for paint manufacturers. For full technical information, resin samples and suggested formulations, write Shawinigan Resins Corporation, Department 1144, Springfield 1, Massachusetts.

FORMVAR[®] and BUTVAR[®] resins by



ADMINISTRATION

Electronic Aids for Management: F

Many small and medium-size chemical companies could reap immediate benefits by following in the footsteps of the larger concerns that already have electronic data processing machines in daily use and additional units on order. Providing they have fairly complex or diversified operations, quite a few industrial companies with as few as 500-1,000 employees could

make profitable use of medium-size data processing equipment, *CW* was told this week in an interview with a pioneer consultant in this field.

In fact, according to John Diebold,* some medium-size companies actually stand to benefit more than larger concerns, relatively, because their paperwork activities—under the old book-

*Of John Diebold & Associates (New York).

keeping methods—have not lent themselves to batch data processing, which the new equipment "can handle beautifully."

Problem for Management: No one doubts that big computers are a paying proposition for the big chemical and oil companies, whose reliance on their "electronic brains" is becoming commonplace. But this question still has to be faced by management of practically every nongiant company in the process industries: Is our company so big that we should have this kind of equipment; and if so, how do we shop for the right model?

Though there's no easy formula that can be applied to every company's individual requirements, there's a steadily increasing fund of information—based on other companies' experiences—that can be used in tackling those problems.

Numerous Sources: Some of this new information is being reported at management conferences, such as the two last fortnight—American Management Assn.'s annual office management conference in New York, and the third annual international meeting of the Institute of Management Sciences out in Los Angeles. Some is available from books, including a recent U.S. Commerce Dept. reference book that compares 84 electronic digital computer systems. Other sources: manufacturers of equipment, such as International Business Machines and Remington Rand; and management consultants who specialize in this problem.

Diebold—who has proposed a list of "symptoms" for management to look for in considering whether a switch to electronic equipment is indicated (*see table, p. 31*)—feels that these devices have some applications of particular value for small and medium-size chemical process companies.

For Top-Level Decisions: For these smaller companies, Diebold says, computers can provide up-to-the-minute data never before so readily and inexpensively available.



WIDE WORLD

DIEBOLD: For smaller process companies, big gains in faster figuring.

How to Shop

Possibly most important, he goes on, are the "simulation" applications that can tell management which of any number of possible moves is likely to work out best. Examples: business results from various proposed product lines from a given group of feedstocks; advantages to be gained from any one of a set of possible mergers; best locations for new plants and warehouses; and optimal power capacity.

One thing Diebold stresses is that management is making a mistake if it figures that an electronic computer will simply do better and faster the very same information-handling jobs now being done by more laborious means. The first consideration, he insists, should be: What information do we really want? He finds that it's often better to set up an entire new set of reports rather than merely redesign or expand the old series.

Pragmatic Approach: One suggestion for management trying to decide what to do about modernizing the company's data processing system comes from chief statistician Romuald Slimak of Remington Rand's Univac Division. Most manufacturers of computer equipment, Slimak says, maintain service centers that perform statistical jobs on a straight-fee basis. He suggests that an executive in doubt bring in what Slimak calls a "one-shot problem"—e.g., where to locate a new plant, estimation of sales quotas by regions, or selection of optimal pricing system for products and by-products from given feedstocks—and see what computers can do for him. It often happens, says Slimak, that a company will keep bringing in such problems until it decides it could save money by leasing a computer for regular use.

A long-range factor is personnel economics. At the management conference in New York, Thomas Cox, Jr., of Owens-Illinois Glass (Toledo), noted that the demand for trained office workers is expected to rise 25% during this decade (1950-60). Meaning: that office chores should be scrutinized to make sure (a) that they're necessary, and (b) "that they are done in a manner that is most economic of manpower."

Need a 'Brain' in Your Office?

Maybe So, If You Have . . .

- Delays in filling orders, billing customers, mailing dividends.
- Too many reports, or important information that's too expensive to obtain, or important data reported too late.
- Too many executives, engineers and scientists doing the work of clerks.
- Been making too many uninformed decisions.
- Too many interoffice requests for information.
- Postponements of decision-making for lack of information.
- Little or no data on productivity, unit cost, or operating efficiency.
- Record files that are too bulky or inaccessible.
- Planning programs that are based largely on hunches or semieducated guesses.
- Times when departments are "caught short" by unanticipated requirements.
- Imbalances in inventories, requisitions, orders.
- Delays in publication of quarterly or annual statements.
- Employees working overtime to get reports out on schedule.



For In-Plant Feeding: More Mechanization

Indications are that the chemical process industries will increase an already-heavy reliance on vending machines for in-plant feeding, a form of mechanization that's keeping pace with stepped-up automation in production lines.

Long behind certain other industries in providing in-plant feeding facilities for its workers, chemical process companies in the past few years have shown signs of catching up, and the use of vending machines has played a big part in the move.

In a survey of 104 chemical plants for *CW*, the Paper Cup and Container Institute found that the chemical industry leans heavily toward the use of vending machines and that it is leading the industry-wide trend toward cutting lunch periods for office workers to a half-hour. These plants, however, report a generally longer lunch period for shop workers.

More Vending Machines: Survey returns indicate that the vending machine is the fastest-growing method of in-plant feeding in the chemical process industry—especially within the constantly growing ranks of plants with fewer than 250 employees. Sixty percent of the respondents are within

this group. While only 48% of the chemical plants now have feeding facilities—compared with 55% of all U.S. plants—vending machines are found in eight out of ten of these plants. Although such equipment has been available since before World War II, 42% of the chemical companies using vending machines report having done so only since 1950.

Sixteen of the 104 chemical plants responding reported adding to their feeding facilities since 1953. Seven plants expanded their facilities by adding more vending machines. Only two plants listed cafeteria expansions. One said it had expanded its snack bar, and six did not specify the nature of their expansions. Sixteen other plants reported completely new installations—including five vending machine installations, four cafeterias, one snack bar and six unspecified.

Reasons for In-Plant Feeding: Providing in-plant feeding facilities is definitely left to management's discretion, only one of the plants indicated that its union contract requires such facilities. Slightly more than 50% of the respondents indicated that such facilities were a matter of company policy, and almost 50% said in-plant

facilities were provided because of a lack of adequate facilities close to the plant.

The third major reason for providing in-plant feeding facilities reflects the industry's trend toward shorter lunch periods. Nearly 45% of the chemical companies reported "lunch period too short to leave the building."

Cafeteria Use: Notwithstanding the increasing preference for vending machines—especially in plants with fewer than 250 employees—chemical companies still outpaced other industries in use of company cafeterias. And this despite the fact that the chemical plants surveyed were, for the most part, smaller than the nonchemical plants responding to a similar survey. (Cafeterias have traditionally been used most extensively by larger plants. In fact, plant cafeterias usually run into financial difficulty unless they're patronized by a considerable number of people.)

Funds from Vending Machines: After some experimentation, industry in general has come to rely on outside specialties for supply and maintenance of vending machines. Of the non-chemical plants using this arrangement, 91% reported receiving a percentage

IN-PLANT FEEDING FOLLOWS THE MECHANIZATION TREND

With automation contributing to the preponderance of chemical plants with fewer workmen . . .

	1947	1954	Increase
1-19 employees	6,300	7,436	1,136
20-99 employees	2,739	2,791	52
over 100 employees	1,049	1,194	145

the trend is toward mechanized feeding facilities:

	Chemical Plants (reporting feeding facilities)	All Industries
Vending machines	81.3%	83.5%
Cafeterias	58.3%	55.0%
Mobile units or carts	9.0%	27.6%
Canteens or snack bars	6.2%	16.8%
Other systems	4.2%	4.5%

of the gross receipts of the machines. Profits from such arrangements frequently come to more than \$1,000/year, and in exceptional cases are reported at \$15,000 to \$75,000/year. As a group, however, chemical companies now using vending machines appear to be getting less income from such arrangements than do other manufacturers—50% of 20 chemical plants that reported such arrangements net \$100 to \$499/year. This small income is not as trivial as it seems when examined alongside incomes received by other manufacturing plants with fewer than 250 employees. Some 58% of the nonchemical plants with fewer than 250 employees received only \$100 to \$499/year from their vending machines. Such income is frequently used to support recreation and welfare projects.

The chief significance in the trend toward the use of vending machines is in its parallel to plant mechanization. As fewer employees are required, the problem of providing adequate in-plant feeding facilities becomes greater. One solution appears to be the vending machine, and manufacturers of these devices are keeping pace with

this technological trend by providing units that dispense more varied types of food and drink—even complete hot lunches. The company cafeteria is not a thing of the past, but in chemical plants at least, the use of food vending machines is increasing steadily.


LEGAL

New Laws for Drugs: Manufacturers of drugs and household chemicals can expect close examination of their products in the coming week; at least two groups will soon begin investigations that could have national ramifications:

A bipartisan Illinois legislative narcotics investigation commission—headed by Sen. John Meyer (R., Danville)—has begun a study of the need for stricter state laws to control the use of drugs. At a hearing, the commission was told that the use of drugs is “a growing social menace,” and that tranquilizing drugs may eventually find misuse, as have barbiturates and amphetamines, in the hands of those seeking a “kick.”

The commission also heard that;
• The misuse of barbiturates is

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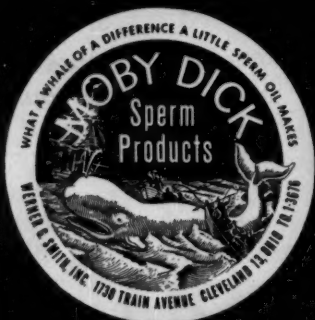
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ADMINISTRATION

comparable to chronic alcoholism in its social and individual effects.

- Pharmacists should be required by law to maintain a permanent inventory of all barbiturates and such drugs as benzedrine.

- Manufacturers and wholesalers of drugs should be licensed and required to report all sales.

- A clause in the Illinois barbiturate law exempting "mixtures" and "compounds," such as patent medicines, should be repealed.

George T. Daughters, Chicago district chief of U.S. Food & Drug Administration, told the commission that a strong state law would go far toward helping control distribution of drugs that can be harmful or that could lead to addiction. Describing Chicago as the second- or third-largest center of drug manufacture, he said that Chicago drug manufacturers in 1954 produced 798,000 lbs. of barbiturates—enough for 18 doses a year for every man, woman and child in the U.S.

Simultaneously with the Illinois investigation, the American Medical Assn. has authorized its committee on toxicology to draft a model law requiring uniform labeling for many potentially harmful chemicals now used in homes and industry.

Dr. George Lull, secretary and general manager of AMA, said there are at least 250,000 of these substances on the market, including paints, putty, soldering fluids, cleansers, polishers, fuels, laundry items, art supplies, toys, and products for the care and repair of automobiles.

Other professional groups are to be consulted in drafting a bill to compel manufacturers to list harmful ingredients contained in household substances along with antidotes to counteract them in poisoning cases.

- **Hair-Spray Suit:** Wella Corp. (Englewood, N.J.) has requested dismissal of a Helene Curtis Industries Inc. (Chicago) suit in U.S. district court, New York, charging infringement of Helene Curtis' trademark, Spray Net, and unfair competition.

Helene Curtis—seeking an injunction and judgment for triple damages allegedly sustained—charges that Wella knowingly infringed the Helene Curtis trademark and applied for the trademark Spray Set. Trial date has not been set.



BENINGTON: In Pittsburgh, he'll keynote industrial hygiene conference.

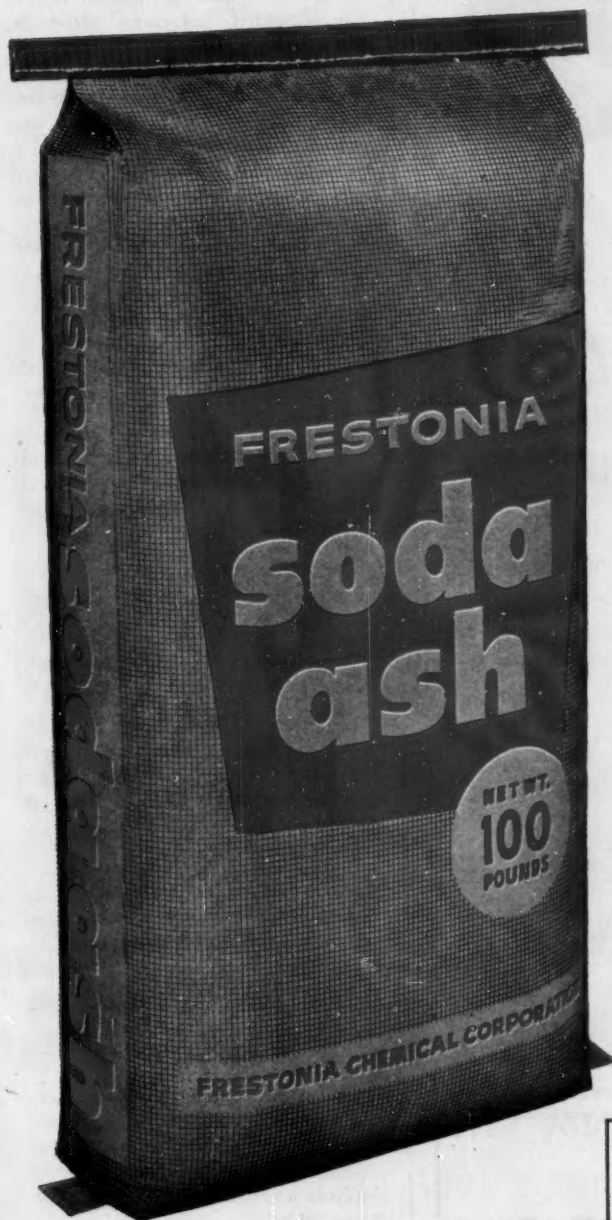
LABOR

The Industry Talks of Hygiene: Of particular interest to chemical process companies' industrial relations and industrial health and safety staff members: The 21st annual meeting of the Industrial Hygiene Foundation, Nov. 14-15 at Pittsburgh. Evidence of this interest is the large number of chemical company participants. Keynoter will be George Benington, president of Allied Chemical & Dye's Mutual Chemical Division.

Andrew Fletcher, president of St. Joseph Lead, will speak at the all-day management conference. And in the joint technical conference, four of the six panel members are from chemical firms: Koppers Co.'s vice-president and director of research and development, Hercules Powder Co.'s medical director, a member of Union Carbide and Carbon Corp.'s legal department, and the director of Du Pont's Haskell Laboratory for Toxicology and Industrial Medicine.

- **50-50 Split for Pensions:** A highly unusual pension plan has been set up by a small Wisconsin firm that does industrial research work. Bjorksten Research Laboratories (Madison, Wis.) will contribute 50% of each year's net profits to a trust fund whose proceeds will be used for employee retirement bonuses or pensions. Each year's company contribution will be credited to individual employees in proportion to their earnings for the year.

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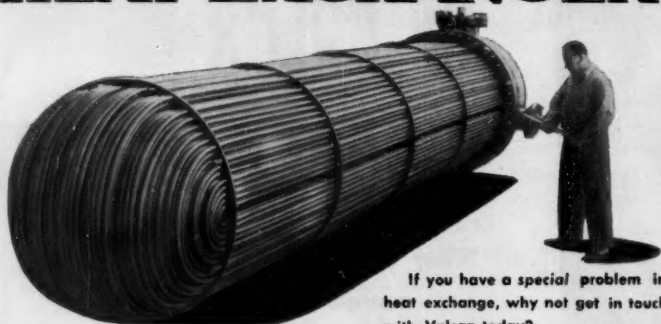
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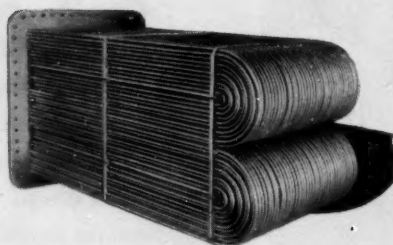
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ADMINISTRATION

Hot Cargo, Hot Chemicals: At Washington, the U.S. Supreme Court has refused to review a circuit court ruling that upholds the legality of the much-disputed "hot cargo" clause in truckers' labor contracts. And at Reading, Pa., members of United Steelworkers (AFL-CIO) have struck the Beryllium Corp. plant because the firm—advised by a physician that a certain employee was allergic to certain chemicals used in the plant—refused to rehire that man after his recent hospitalization. The union contends the man is able to work.

KEY CHANGES

Glenn W. Clark, to president and director, Mississippi River Fuel Corp. (St. Louis, Mo.).

H. Boris Burns, to board chairman and chairman of the executive committee, U.S. Vitamin Corp. (New York).

Daniel H. Terry, to vice-president, research and development, Bon Ami Co. (New York).

Sam Gurley, Jr., to vice-president, sales, H. K. Porter Co., Inc. (New York).

William C. Kay, to assistant general manager, Organic Chemicals Dept.; and **Ernest R. Bridgewater**, to assistant general manager, Elastomer Chemicals Dept.; Du Pont (Wilmington, Del.).

James Beckett, to chairman, and **A. Wallace Chauncey**, to vice-chairman, executive committee, Interchemical Corp. (New York).

Edward Hartshorne, to general manager, Nuclear Fuel Division, Olin Mathieson Chemical (New York).

Charles J. O'Connor, to board chairman; **Henry H. Reichhold**, to president; **Albert G. Goetz**, to board vice-chairman; and **Donald B. Tuson**, to director; Reichhold Chemicals (White Plains, N.Y.).

O. V. Tracy, to vice-president, Esso Standard Oil (New York).

KUDOS

To **George F. Reddish**, professor of microbiology and public health, St. Louis College (St. Louis, Mo.), the 1956 Achievement Award of the Chemical Specialties Manufacturers Assn.

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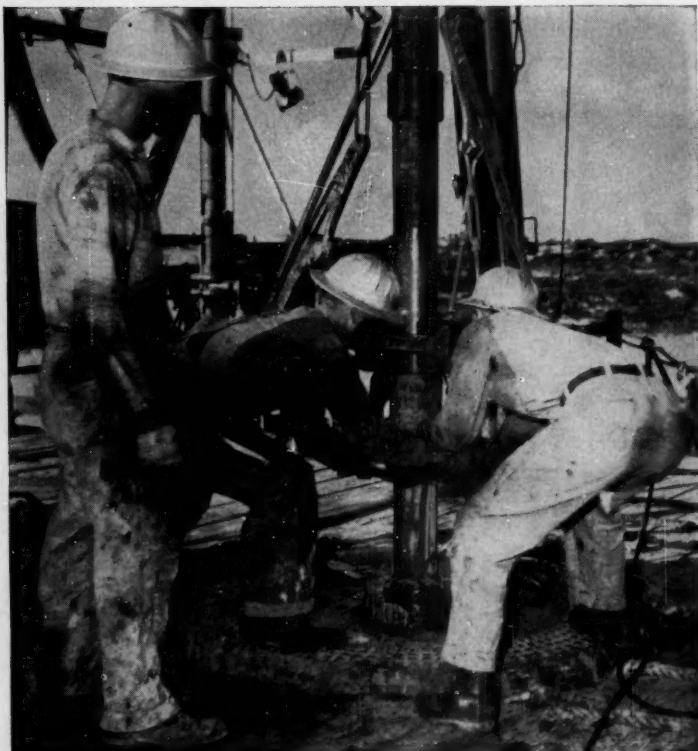
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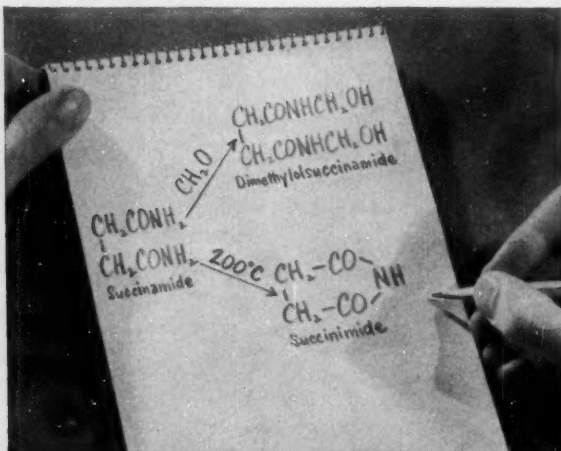
Life on the Chemical Newsfront



FIELD TESTS OF CYPAN® Drilling Mud Conditioner, a new organic water-loss control reagent, have produced excellent performance reports. As wells go deeper, a steady flow of special muds is needed to carry away cuttings, lubricate drill bits and maintain hydrostatic pressure. These muds must stand up under increasingly severe heat and contamination conditions. CYPAN stabilizes muds even at temperatures as high as 350° F. It resists contamination by salt, which otherwise would flocculate the colloidal clays present, and retards water loss so that muds maintain gel strength, lubricating and caking properties. A high molecular weight, acrylic-type polymer, CYPAN is readily soluble in water and can be added easily to mud systems. (Industrial Chemicals Division, Dept. D)



THERE'S A SOFTER FEEL AND BETTER DRAPE in the blouse this lady is examining, for it has been treated with Cyanamid's new CYANATEX® 3119 Softener. Both natural and synthetic fibers are lubricated and softened by this general purpose non-ionic textile finishing agent, making cloth easier to handle during processing as well as improving the appearance and "hand" of the finished garments. CYANATEX 3119 can be used alone, or in conjunction with other textile chemicals without any adverse effect on desirable characteristics such as crease retention and shrinkage control. (Organic Chemicals Division)



A DIAMIDE, Cyanamid's succinamide is now available for your investigation as an intermediate in which both terminal groups offer typical amide reactivity. For example, reaction with formaldehyde yields the dimethylol derivative which has possible interest in the modification of cellulose or starch. Heating produces succinimide, useful as an intermediate in the preparation of an unusual brominating agent, N-bromosuccinimide. Cyanamid's newly developed process for producing succinamide opens the way for increased acceptance of this intermediate for commercial use. (New Product Development Department, Dept. D)



Interior Designer: Michael Greer, A.I.D.

CONTINUED BEAUTY UNDERFOOT is assured in this living room, one of many rooms in a group of apartments decorated by members of the New York Chapter, American Institute of Decorators, in the Royal York Apartments, New York City. Wall-to-wall carpeting has been treated with CYANA® Soil Retardant to keep the rug new-looking between cleanings. Wool, cotton or synthetic fibers are treated at the rug mill. An invisible protective barrier is formed so that dirt particles can no longer readily adhere to the carpet fibers. Normal on-floor maintenance keeps rugs treated with CYANA in excellent appearance. (Organic Chemicals Division)



24 MILLION POUNDS OF ANILINE A YEAR is the goal of a new Cyanamid plant to be constructed at Willow Island, W. Va. The plant will use an entirely new process developed by Cyanamid research. For almost forty years a major supplier of aniline, Cyanamid is expanding its capacity in response to steadily increasing demand for products and intermediates dependent upon this building block of organic chemistry. Current data sheets on Aniline Oil, giving properties, specifications, uses and test methods are available on request from American Cyanamid Company. (Organic Chemicals Division)



HIGHER FIDELITY MUSICAL TONES are reproduced by a new phonograph designed by Pickering and Company of Oceanside, N. Y. The delicate mechanism of the Fluxvalve Pickup is sturdily housed in a unique one-piece head molded from Cyanamid's LAMINAC® Polyester Resin. The stylus is ingeniously supported in a separate LAMINAC molding, easily inserted into the head. The excellent frequency response of the Fluxvalve is protected indefinitely by the moisture-resistant and dimensional stability of LAMINAC. Another advantage is greater economy in production through the elimination of assembly problems, thanks to its integral construction. Precision molding to within .001" tolerance with LAMINAC Resins has solved critical alignment problems. (Plastics and Resins Division)



Additional information may be obtained by writing on your letterhead to the Division of American Cyanamid Company indicated in the captions.

**Building for the Future
Through Chemistry**

SALES AND DISTRIBUTION



To Go International, Go 'Local'

This week, another pin was added to the map that hangs in the board room of Pfizer International. It represents the latest addition—a pharmaceutical plant at Arnprior, Ont.—to Chas. Pfizer's far-flung, fast-growing chain of foreign subsidiaries.

Pfizer International has had an astonishing growth. In the late '40s, it was operating as an export department of Chas. Pfizer, with sales of only \$3 million/year, mostly in antibiotics. In 1950, Pfizer set up an international division that took over all phases of the company's nondomestic business. Last year, overseas sales rose to \$54 million—almost a third of all Pfizer sales—and this year's outlook is even better. Probable level for '56: over \$57 million.

Just how fast the outfit is growing is illustrated by the record for the past 12 months. In that time, Pfizer International has opened four new plants, begun construction of five others.

Much of the credit for the emergence of Pfizer International as a major factor in the worldwide sale of drugs belongs to John J. Powers, Jr., senior vice-president of the parent company

and chairman of the board of Pfizer International Subsidiaries. Though an amateur in overseas marketing when he began, Powers nonetheless believed there was a tremendous potential market in world sales, urged management to go all out for it.

Oddly, publicizing Pfizer's name among overseas customers proved easier than doing the same in the U.S. Reason: although the company had been in the fine-chemicals business for almost 100 years, it did all its selling in bulk quantities. Thus, the name, though well-known to drug houses, was unfamiliar to the man on the street.

A more favorable situation existed overseas. During World War II, Pfizer was the largest producer of penicillin and streptomycin and shipped it abroad under its own name. As a consequence, Pfizer actually had a stronger label position there than it had in the U.S.

In setting up its foreign subsidiaries, an effort has been made to view the world market as a series of individual "domestic" markets. This viewpoint explains many features of Pfizer In-

ternational's operating techniques, including:

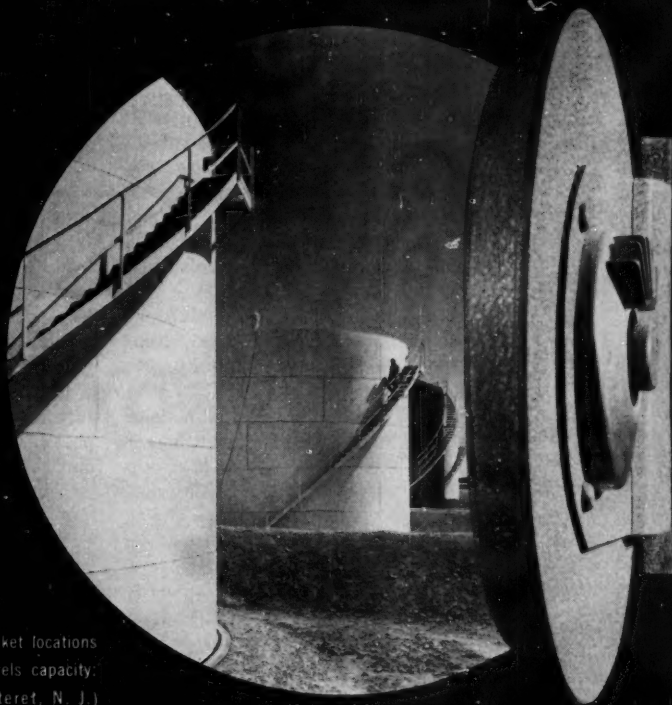
- Decentralization (i.e., having managers in each foreign market determine—after considering local trade and other practices—what marketing policy should be).
- Emphasis on local employment—top to bottom.
- A mixed situation as regards distributor arrangements.

Organization: Pfizer International divides world markets into seven groups: northern Europe (including France, England, Scandinavian countries, Germany, Switzerland), southern Europe (Spain, Italy, Greece), Africa, Mexico (including Central America), Brazil, Spanish-speaking South America and the Caribbean countries.

An area manager is in charge of sales training, advertising and promotion in each area and, except for matters affecting broad company policy, there's very little referred back to New York. Under the area managers are general managers recruited from the various countries to serve in their particular locality.

There's no rigid pattern for estab-

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Products of other divisions of Air Reduction Company, Inc. include: AIRCO, industrial gases, welding and cutting equipment • PURECO, carbon dioxide, liquid-solid ("DRY-ICE") • OHIO, medical gases and hospital equipment • NATIONAL CARBIDE, pipeline acetylene and calcium carbide.

SALES

lishing Pfizer International in a foreign market. It's usually a compromise between compulsion and desire that determines what the final set-up will be, so there's not much sense in adhering to elaborate blueprints. Changing situations—political, trade, etc.—make a degree of flexibility imperative.

Though some types of manufacturing abroad can result in big savings, this usually isn't so with production of pharmaceuticals. Pfizer could probably serve all its foreign subsidiaries from state-side plants as economically as it does by having plants overseas, but there are other reasons for the company's investment in foreign plants. Says Chairman Powers: "We think of these markets as places to stay and grow . . . to establish ourselves firmly in a country; we think it's important to give the sense of being a local company—not a branch of a New York firm."

Detail men for Pfizer International operate very similarly to their colleagues in the U.S., don't write any orders but disseminate medical information to doctors, passing out samples, etc. For this work, the detail men receive a straight salary with compensation rates based on the local standards.

Reaching the doctor takes the same form overseas as it does in the U.S. Direct mail, medical journal advertising, other promotion procedures are utilized in about the same proportion overseas as they are in the U.S. What is different is the particular emphasis given to any aspect of the sales story.

That's left to the prerogative of the man-on-the-spot, the area and general managers.

Though an effort has been made to confine distribution to one outlet per country, local practices, more than company wishes, oftentimes prevail. The result is a mixed situation; in some countries Pfizer International operates alone; in others it operates through a distributor; or, in still others, it uses both methods.

Competition, present from the beginning in the form of other American firms, is growing steadily. Too, local companies often make a strong appeal to nationalistic sentiments. The fact that Pfizer has been willing to become a part of the community, has been willing to invest in plants where local personnel is almost exclusively employed has, in most cases, greatly helped Pfizer International grow.

Looking ahead, Powers predicts further growth, with increasing emphasis on decentralization. "If you don't build, you're on the surface of a country's economy and can get pushed out," he told *CW*. "But," he added, "when you're committed, you force yourself to make good . . . it's not a matter of deciding to cross off an operation with the swipe of a pen. It's hard work, and a lot of worry; but once you reach a certain point, you're solid, hard to move and in business for good."

The philosophy evidently pays off, if Pfizer International's present—and anticipated—sales are any indication.

Where Pfizer Operates Abroad

AMERICAS

Argentina (BCD)
Brazil (CD)
Canada (BCD)
Cuba (D)
Colombia (D)
Mexico (CD)
Panama (CD)
Puerto Rico (D)
Venezuela (CD)

EUROPE

Belgium (CD)
England (ABCD)
France (ABCD)
Germany (BCD)
Italy (BCD)
Netherlands (D)
Norway (D)
Spain (CD)
Sweden (D)

ASIA

Australia (CD)
Japan (ABCD)
Philippines (BCD)

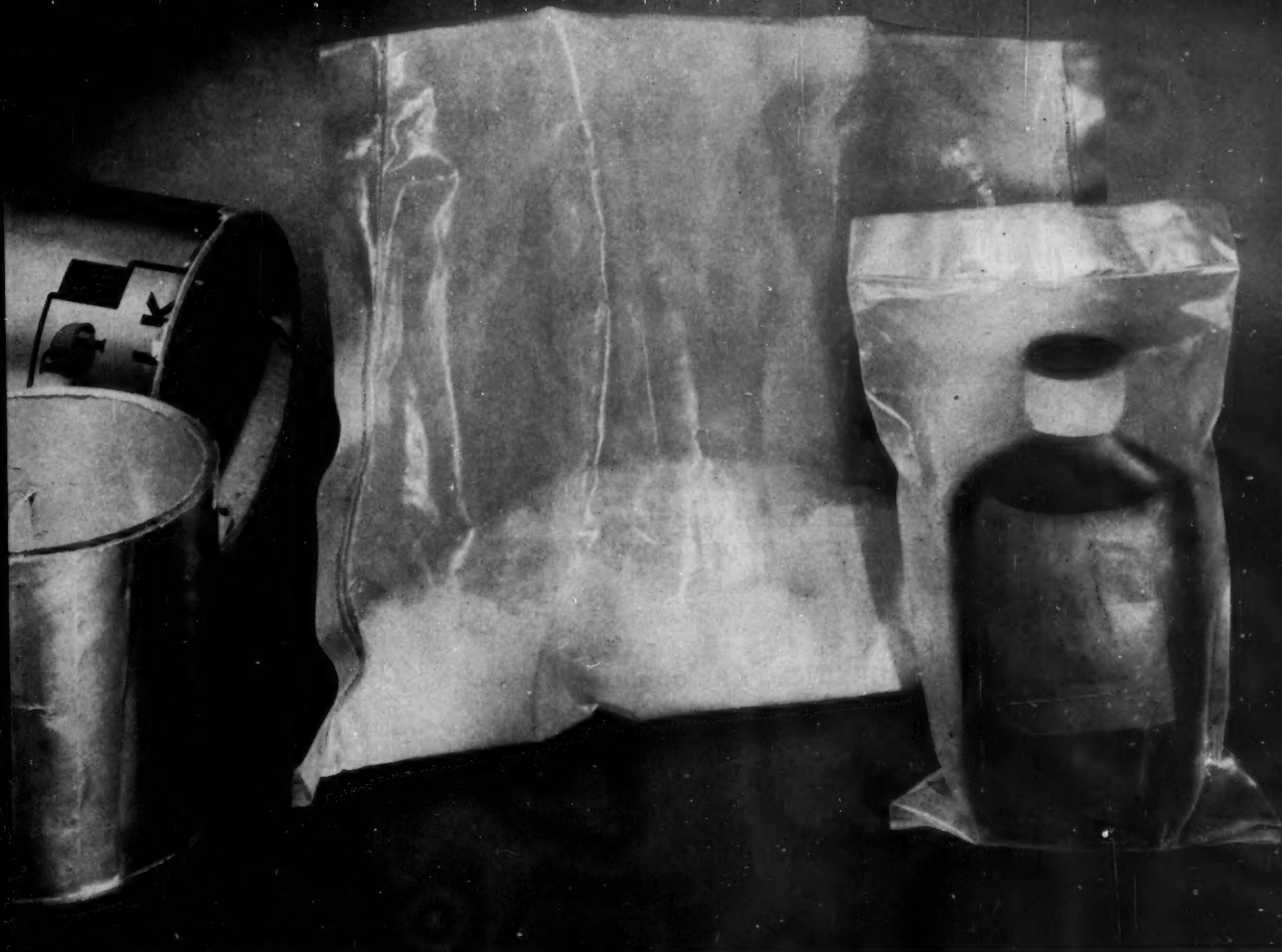
Fermentation plant—A

Packaging and production—B

Warehouse—C

Sales & advertising offices—D

In addition to the above, Pfizer International also has facilities in Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Ecuador, Peru, Uruguay, Iceland, Ireland, Portugal, Belgian Congo, Rhodesia, South African Union and Korea.



polyethylene packaging has

Extended the shelf life

"Due to polyethylene," reports E. H. Lockridge, general manager, Dental Perfection Company, Glendale, Calif., "our products are good for two to three years even in the tropics, and almost indefinitely in cooler, drier climates. Returns have been cut from 5% to less than 0.1%. Certainly, a great deal of our sales increase is directly attributable to polyethylene packaging."

"A major distribution problem has been eliminated also . . . that of air shipments where packages are subject to rapidly changing air pressures. Other materials frequently burst but, due to its superior strength and ability to 'breathe,' we have yet to have a polyethylene bag damaged by pressure changes."

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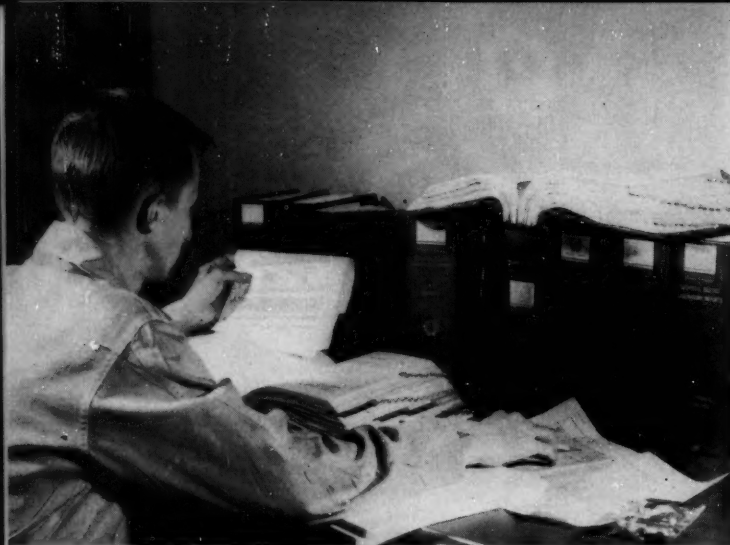
Oik fast-setting liquid plastic is used in taking impressions for dental plates. It is mixed with a powder. Both the bottle and the powder are individually packaged in polyethylene bags. They are combined into a neat package by wrapping the bag containing the powder around the bag containing the bottle, placing them both in a larger polyethylene bag and inserting in a shipping canister.

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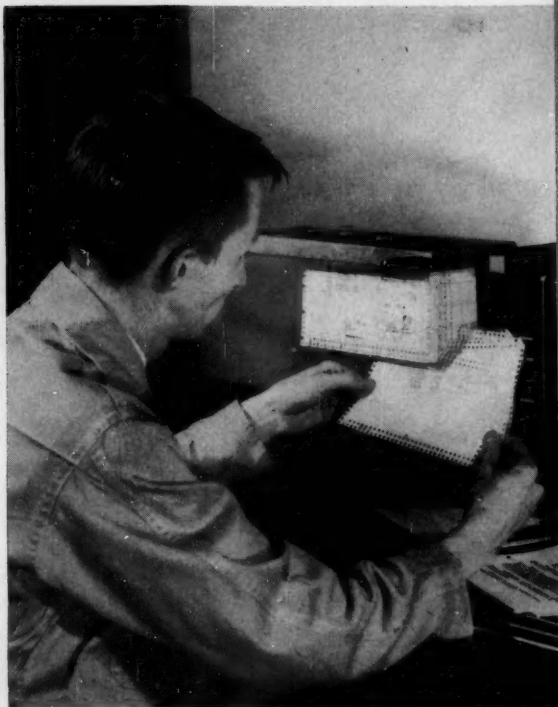
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TIME CONSUMER: Long searches of technical reports were often necessary before Shell Chemical adopted . . .

MECHANICAL INDEXING. All application data for solvents is now coded and summarized.

SALES



Punch Cards Up Tech Service Productivity

Growing use of technical service as a sales tool and the still-severe shortage of qualified technical personnel are placing increasing demands on the technical service man's time. To relieve that man of routine duties, and thus increase his productivity, a limited but growing group of chemical companies have been developing mechanical methods of product application data handling.

Shell Chemical, one of the firms to recently adopt such a system, has even gone so far as to design a setup exclusively for product use data. Most users, however, code some technical service data as part of a larger, more extensive system. Union Carbide's Bakelite Co. division punch-codes some technical service data in a report-indexing system used by its development department. Other Carbide divisions are weighing plans to install technical service data indexing. Another measure of interest: Carbide received some 80 requests for copies of its Silicones Division's recent paper on research data coding.

The methods offer, for example, speedier literature searching and in-

creased ease in familiarizing new personnel with the laboratory's previous work.

Shell's approach is representative of various punch-card systems for classifying data. Chemists find the system extremely valuable in finding information to solve technical service problems. Here's how Shell's solvent group codes its data:

Information in laboratory reports is broken down into three broad groups: application, composition and properties. Each of these categories is assigned an edge of an edge-punched card. These broad groups are, in turn, broken down into subgroups. The application code, for instance, classifies all product application work into nine broad fields (the hundreds digit in a three-digit number). These are further organized into nine subgroups (the ten digit). Again, in turn, each ten digit code has nine subgroups (the unit digit). Thus, the number 532 would code solvent applications by 500 (graphic arts), 30 (photographic processes) and 2 (processing of the latent image).

The composition and properties

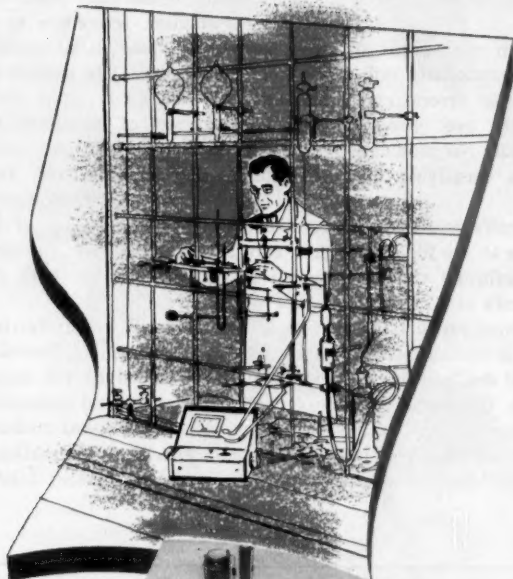
codes are similar. For composition, components are classified by presence or absence in six groups: 0 (absence), 1 (ketones), 2 (esters), 3 (alcohols), 4 (dilutents) and 5 (all others). Physical properties are coded into three categories: volatility, solvency (by viscosity of nitrocellulose solutions) and bluish resistance.

Besides the classification punches, each card also contains space for the written recording of pertinent data. References to the original report, the test data (such as solvency, dilution, boiling range, density, composition, evaporation rate) are included.

To use the system to locate previous work, for example, the researcher uses the coding system to classify the information. He then programs the card selector unit accordingly, and then runs the card file through the unit. Only the cards containing data which is relevant to the problem are separated.

About 15 years of product application work have been punch-coded into some 5,000 cards. Shell Chemical's solvents group finds that, on the average, 1 to 10 punch cards are necessary

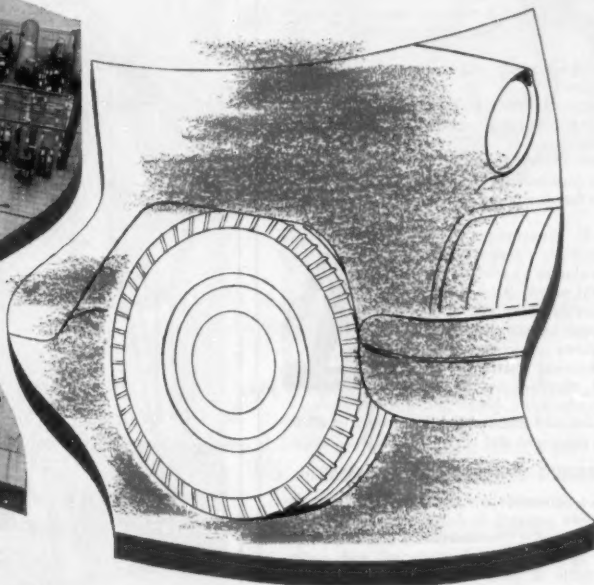
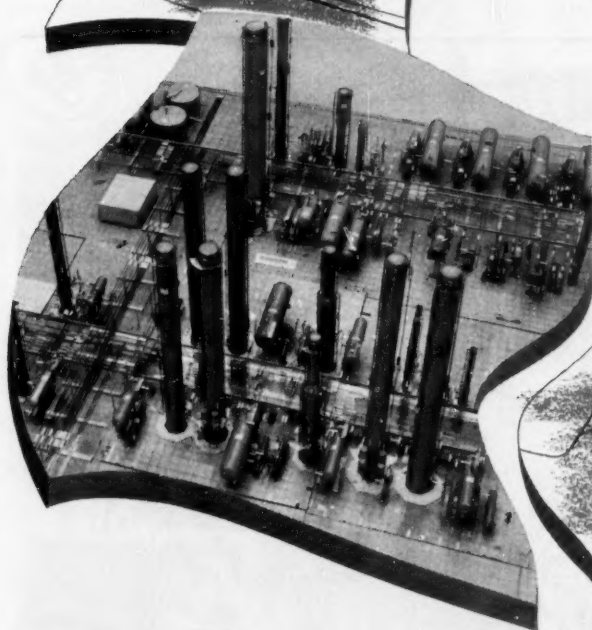
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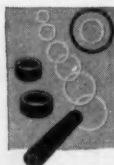
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SALES

to code the average lab report. In exceptional cases, however, the number may exceed 500.

Switching over from index cards to punch cards is not particularly difficult. Shell estimates that several men working intermittently over several months handled the job. No problems were encountered in classifying the information.

Generally, all of Shell's professional personnel have access to the file. The company has held informal training sessions on the method's use, has also prepared a set of printed instructions.

To avoid mistakes in coding reports into the cards, most of the "punching" is done by one man thoroughly familiar with the system.

Biggest advantage of the punch cards, says Shell's Bob Mims, who is

responsible for maintaining the system, is the speedup in literature searching. Within 30 minutes, references to all work previously done in a specified area can be located. The written information on the cards often eliminates the necessity of consulting the original report—often the case when the index card system was used. And, adds Mims, the method eliminates cumbersome cross-referencing of index cards, makes it easy for new people to become familiar with the earlier work.

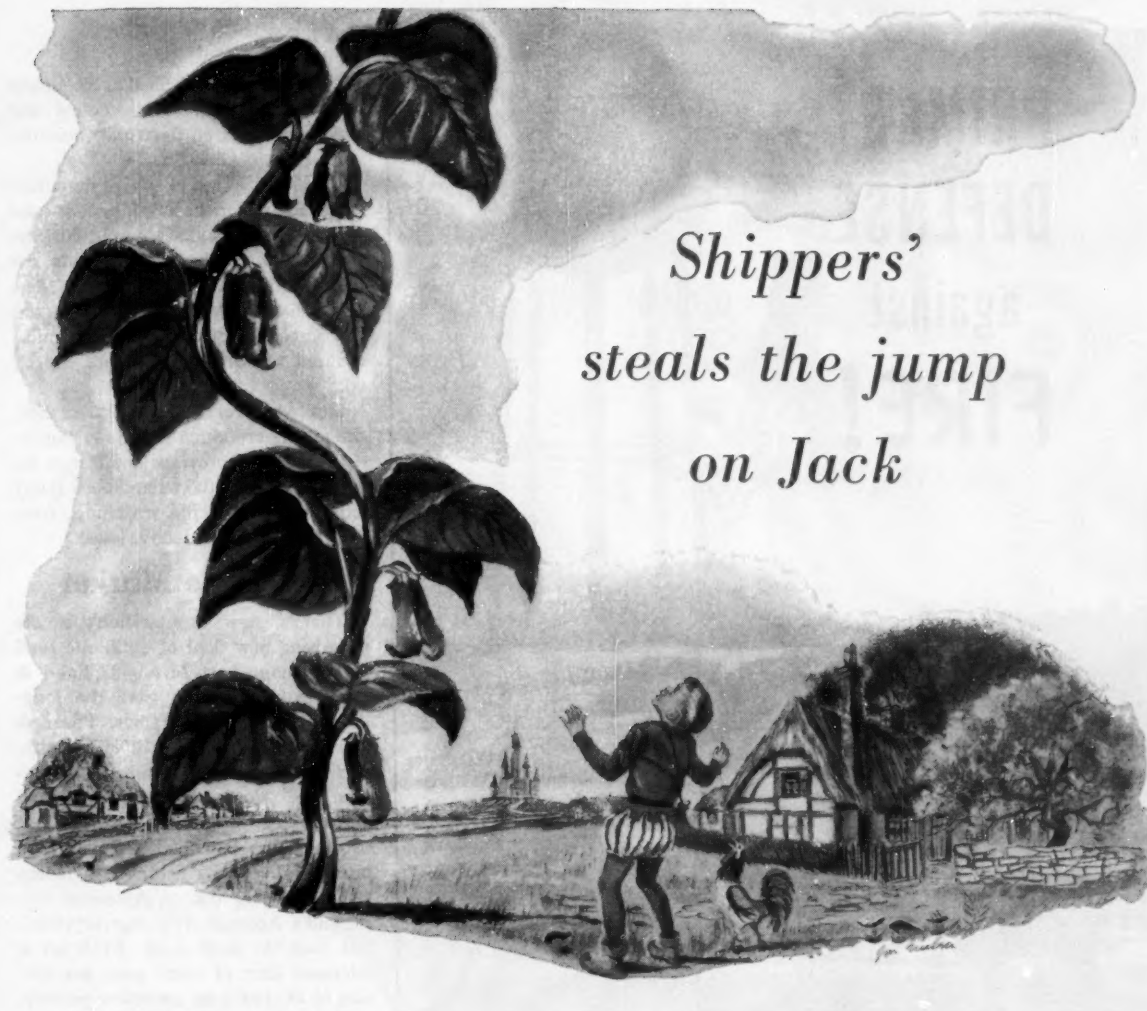
Such benefits and relatively few disadvantages (mispunching, loss of a card leaves no record of the card's loss) explain why chemical companies are making use of automated methods to speed data handling. International Nickel Co. employs a system funda-



Railroad Lift for Trucks

PIGGY-BACKING with a difference—they leave the tractor behind—is now part of the operations of the Missouri Pacific Lines. The trailer is spotted at shipper's platform and sealed after loading is completed. A tractor delivers the trailer to a

gondola or any type of flat-bottom freight car that's available. Gentries, like the one above, have been erected in some 14 cities served by the MOP and Texas & Pacific. Some 200 trailers and 100 chassis for the operation are now under construction.



Shippers' steals the jump on Jack



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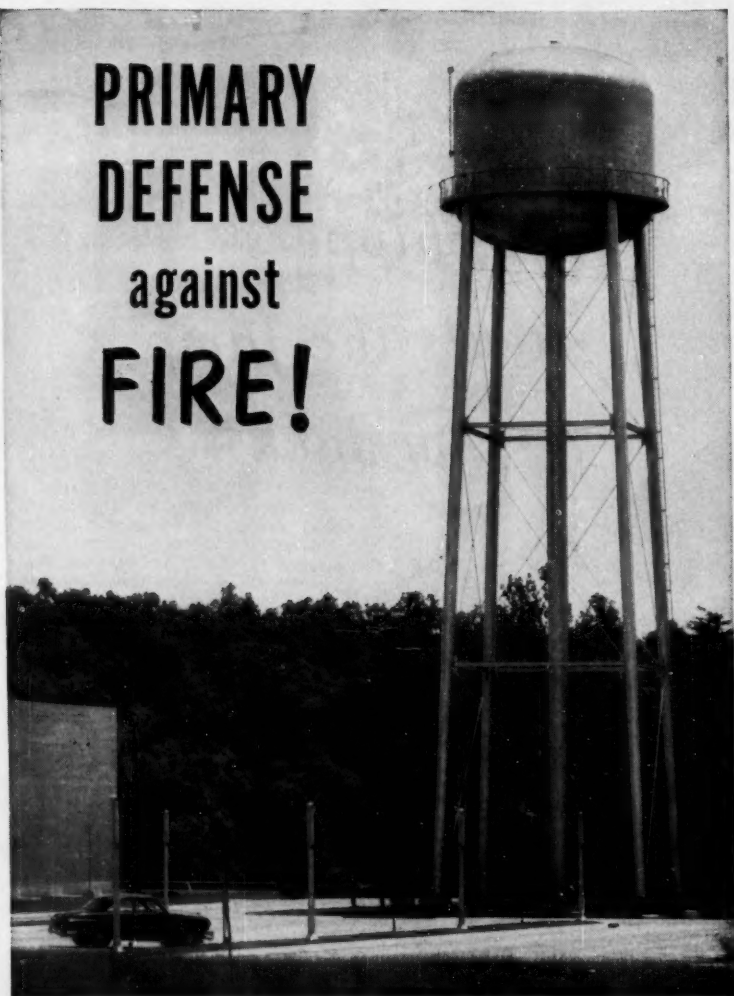


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SALES

mentally similar to Shell's. Technical service data, however, is coded and filed with research data and literature references.

The McBee Co., one large manufacturer of punch-card equipment and supplies, reports that chemical industry use of mechanical methods for data handling is steadily rising. The 1955-56 fiscal year, adds the firm, was the best ever for its sales to chemical customers. Further boosts are expected.

But whatever the specific method, the results are much the same. Punch-card coding of previous application information saves the technologist many tedious hours of file searching, frees him for more productive work.

Two for the Market

There's now competition in the promising new field of antibiotic food preservation. Last fortnight, Food & Drug Administration gave the long-awaited go-ahead to Chas. Pfizer & Co.'s sale of Biostat (20% oxytetracycline; 80% inert ingredients) to extend the storage life of uncooked poultry.

The action launched a second firm into the still-young field, FDA having given a similar o.k. to American Cyanamid's Acronize (chlortetracycline) last year. In both cases, FDA set a tolerance limit of seven parts per million of antibiotic on uncooked poultry.

The move should trigger a no-holds-barred battle between the two firms for an estimated \$200-million-plus (U.S. and overseas) market. Poultry processors are the initial sales target (*CW*, March 24, p. 54).

Cyanamid, selling under a "rigid franchise agreement," is already selling to 150 poultry processors with a claimed 10% of the market. Pfizer, seeking to offset this lead, will sell Biostat to "any recognized poultry processor" without company surveillance over use of the product in the poultry plant. J. D. Langlois, head of Pfizer's food and beverage department, told CHEMICAL WEEK that Biostat will be offered much as other bulk chemicals are, but in only one size, a 2-kilo, polyethylene-lined metal can "competitively priced" at \$76/kilo (just under 1/2¢/lb. of treated bird).

Pfizer shied away from a franchise-type marketing scheme, says Langlois, because of the difficulty in policing such a program and because the U.S.

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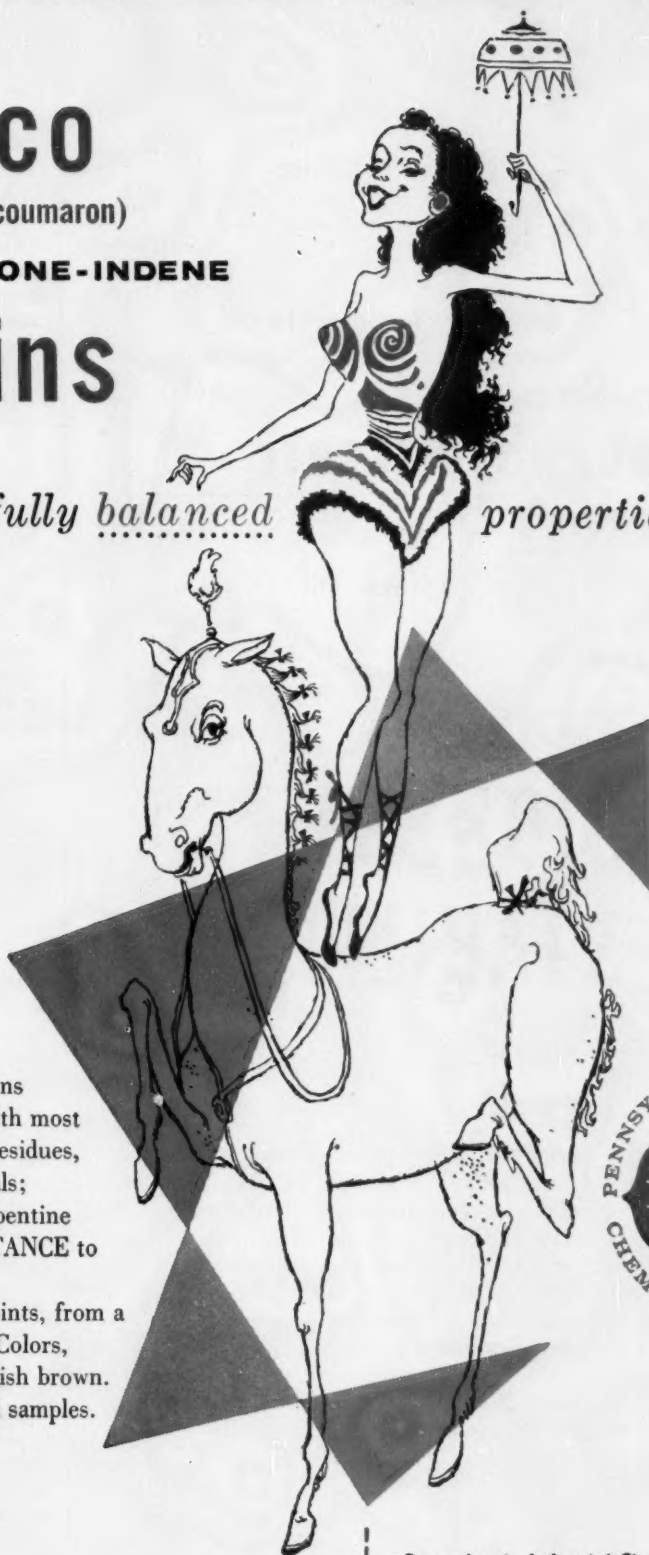
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(CW)

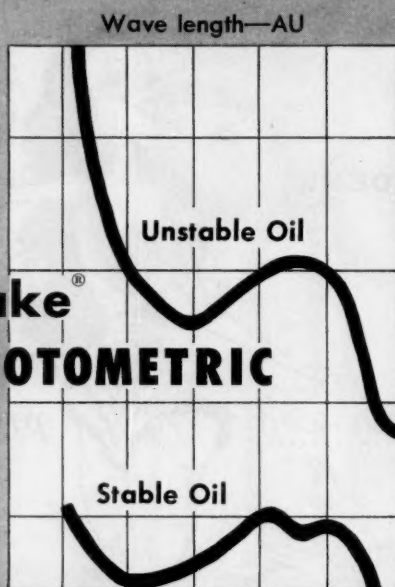
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Dept. of Agriculture will probably soon get authorization to establish a poultry plant inspection system.

Again in contrast with Cyanamid's approach, Pfizer plans no national promotion of a trademarked poultry process. But some other type of promotional assistance for Pfizer customers has not been ruled out of future sales strategy. Meanwhile, to get marketing efforts quickly under way, Pfizer will begin advertising its process to the food industry in trade publications.

The future for antibiotics in fish and other meat and vegetables also appears to be brightening (see p. 98). Cyanamid recently won approval for its Acronize treatment of fish in Canada, and Pfizer's Canadian application for its Biostat is pending. Both firms are also planning to seek comparable U.S. governmental approval.

Similarly optimistic were speakers at FDA's Fourth Annual Symposium on Antibiotics recently held in Washington (CW, Oct. 27, p. 134). Typical opinions:

- The low capital investment required for antibiotic preservation will be a particular boon to areas lacking the heavy capital needed for large-scale refrigeration—(F. E. Deatherage, Ohio State University).

- Antibiotics used alone or with small doses of ionizing radiation give tools today to reduce spoilage caused largely by bacteria; this may allow prepackaging of meat at the wholesale level—(Charles Niven, Jr., American Meat Institute).

- Pre- and post-harvest application of antibiotics can control bacterial decay in a wide range of fresh vegetables. Product life can be extended 24 hours without refrigeration, long enough to substantially reduce huge spoilage losses during shipment. But the problem of heavy residues on treated vegetables and fruits must be solved before FDA will grant approval—(Wilson Smith, Jr., U.S. Dept. of Agriculture).

- Antibiotics may prove valuable in retarding development of food-poisoning bacteria and heat-resistant flora in custards, cheeses and milk, and in reducing heat-processing times in the canning industry by synergistic action with heat—(Joseph Stern, University of Washington).

Such potential undoubtedly means extensive market development projects for antibiotics will soon be under way.



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C W Report

In Three Parts

Pesticides

Past, Present and Prospects

by Carl D. Fischer



2. Insecticides, Repellents, Fumigants



WHERE THEY STAND

ON THE PESTICIDE SALES LADDER

million dollars

70

Allied Chemical & Dye[†]

60

American Cyanamid^{†, ‡}

50

15 U.S. chemical firms with more than \$10-million/year sales*

40

Calspray

Du Pont

30

Dow

Shell[†]

20

Olin Mathieson

Stauffer[†]

Food Machinery

10

Diamond Alkali

Monsanto

Montrose

Rohm & Haas

Hercules

Velsicol

0

*Estimated figures.

[†]Includes fertilizer sales.

[‡]Includes antibiotics sales.

More Demand from Man and Beast

The first of three reports on the U.S. pesticide chemicals industry (CW, Oct. 27) last week covered chlorinated insecticides, phosphorus insecticides, miticides and rodenticides. Too, the first installment included discussion of pesticide marketing, the industry's growth prospects and general economic considerations relating to the field. This—the second report—analyzes insecticides from botanical sources, dairy and livestock insecticides, repellents, household insecticides, fumigants and growth regulators—considered part of the pesticide picture.

Pesticide production in the U.S. is well on its way to becoming a \$1-billion business by 1975. To help achieve that sales goal, pesticide producers count as heavily on the growing importance of insecticides and repellents that prey on humans and animals as they do on plant pesticides.

The materials treated in this report, already impressive in sales volume, are bound to make still further sales gains in the future. Reason: to meet future food requirements of a growing population, there must be a reduction of livestock losses from insects and parasites—a loss estimated by the U.S. Dept. of Agriculture at \$940 million/year. Moreover, the consuming public is being conditioned to demand greater freedom than ever before from the nuisance and filth of insects affecting them personally.

Demand 20 years hence for food high in protein, minerals and vitamins will be substantially greater than it is

today. This trend is already evident (see chart p. 57; *Our Changing Eating Habits*).

Standards of health are higher in this country than ever before, and are steadily rising. Pesticides are partly responsible for this gain. Undoubtedly, insecticides and repellents used against insects affecting both man and animals will play an even more active role in this program in the future.

A number of chlorinated insecticides (discussed in the first report) are being used on livestock to control numerous species of flies, mites, ticks, keds and grubs—for example, DDT, methoxychlor, BHC, lindane, chlordane and toxaphene. Many of these products are used in household aerosol and space sprays. Phosphorus insecticides—such as malathion, Diazinon and Dipterex—also serve effectively in controlling flies in dairy barns.

These materials are applied in various ways. Sometimes users make them into baits containing the toxicant and an attractant (e.g., sugar) on an inert carrier. In flake or granular form, the pesticides are scattered about the barn floor, on window sills or other locations where flies and other insects congregate.

Another device—the animal back-rubber—has become popular (18,000 in Iowa alone) during the last two or three years in controlling insects on beef and dairy animals, which like to rub themselves against posts, trees and fences. By installing canvas (or bur-lap-covered cable) back-rubbers treated with insecticides, farmers provide

the animals with means of applying insecticides to themselves. It's practical, effective, cheap.

A combination of DDT and butoxypolypropylene glycol is frequently used to protect range and feeder stock. In addition, methoxychlor and butoxypolypropylene glycol are becoming increasingly popular for dairy animal use.

Chlorinated and phosphorus insecticides, while extremely useful for many purposes, have certain limitations in livestock applications. They're effective against livestock pests in small doses, but may be too toxic for direct application on animals. In some cases, harmful residual amounts could find their way into meat or milk. For that reason, other materials—including pyrethrins, allethrin, thiocyanates, and a number of adjuvants—are important for direct use on animals.

A more complete listing of dairy and livestock insecticides, repellents, and household insecticides is included in the tables on pp. 66, 67, 68, 73.

Pyrethrins: The insecticidal products of pyrethrum flowers—pyrethrins—have occupied a major position in the insecticide field for many years.

Pyrethrum, introduced into the U.S. some 100 years ago, in the past was largely supplied by Dalmatia and Japan, but Kenya, Tanganyika and the Belgian Congo are now the principal growers and suppliers.

For years, dried pyrethrum flowers containing 1 to 3% pyrethrins have been shipped to the U.S. for extraction. But African flower-growers re-

IN THIS EXTENSIVE pesticide industry survey, CHEMICAL WEEK gives its chemical process industry readers a detailed look at the status and potential of the fast-growing pesticide branch of U.S. agricultural chemical manufacture.

Statistics and market estimates were obtained from so many sources that it would be impractical to give complete references. Marketing and production figures, in many cases, are averages or approximations, offered by the author as "order of magnitude" impressions rather than as absolute values. For exact data—especially on pesticide toxicology and end-use applications—CHEMICAL WEEK readers are referred to specific literature on the subject and to manufacturers of the chemicals.

In compiling this inclusive report, considerable time was spent in checking accuracy of the data appearing in the text, charts and tables. In a report of this scope, however, it is impossible to guarantee perfection. Thus, neither CHEMICAL WEEK, nor Carl Fischer, nor Carbide and Carbon Chemicals Co. can take responsibility for the completeness and accuracy of the statistics and data.

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cently built their own extraction plant, and this situation may change in the near future.

During the years immediately prior to World War II, pyrethrum imports averaged about 13 million lbs./year (valued at \$3 million/year). Imports reached an all-time high in 1945—more than 18 million lbs. of flowers containing 1.3% pyrethrins. That's equivalent to 234,000 lbs. of pyrethrins.

When DDT was introduced for civilian use in 1945-46, the volume of pyrethrin imports dropped sharply. But with more and more emphasis being placed on the importance of pesticides in relation to public health, safety and welfare, pyrethrin use has once again increased—in 1955, imports reached an estimated 6.6 million lbs.

Best market for pyrethrins is in dairy, household, institutional and industrial sprays. Biggest advantages of pyrethrins: quick knock-down action against flying insects, roaches and other crawling insects, and safety to humans and animals.

One big shortcoming: the pure product sells for about \$55/lb. For this reason, pyrethrins will never become serious competition for such materials as DDT, methoxychlor and lindane, which sell for about 50¢/lb., \$1.22/lb., and \$7/lb., respectively.

Allethrin: Synthesis of allethrin—a compound closely related to pyrethrins—was announced in 1949 by the U.S. Dept. of Agriculture. Research by Schechter, Green and LaForge led to the first preparation of allethrin, a culmination of nearly 40 years work to determine pyrethrins structures.

Like pyrethrins, allethrin knocks down insects rapidly and has about the same toxicological properties. It's different only in its inability to be synergized to the same extent as pyrethrins.

Allethrin is competitive with pyrethrins in certain applications, especially in space-spray aerosols for

use against flying insects. It fared well in 1955, when approximately 39 million aerosol-type containers of space-spray insecticides using allethrin and/or pyrethrins were packed.

Synergists: Extensive research has also gone into finding chemicals that extend the effectiveness of pyrethrins and allethrin; target is to use less insecticide without losing effectiveness. Although these extenders, or synergists, are usually not potent insecticides themselves, they do spark the insecticidal activity of pyrethrins or allethrin and thus become valuable compounds.

Most important of the extenders are piperonyl butoxide, propyl isome, Sulfoxide, and MGK 264. Toxicologically, all of these materials are considered safe for use by humans and on animals. Therefore, when such materials are combined with pyrethrins or allethrin, they maintain the very low order of toxicity of the unextended materials.

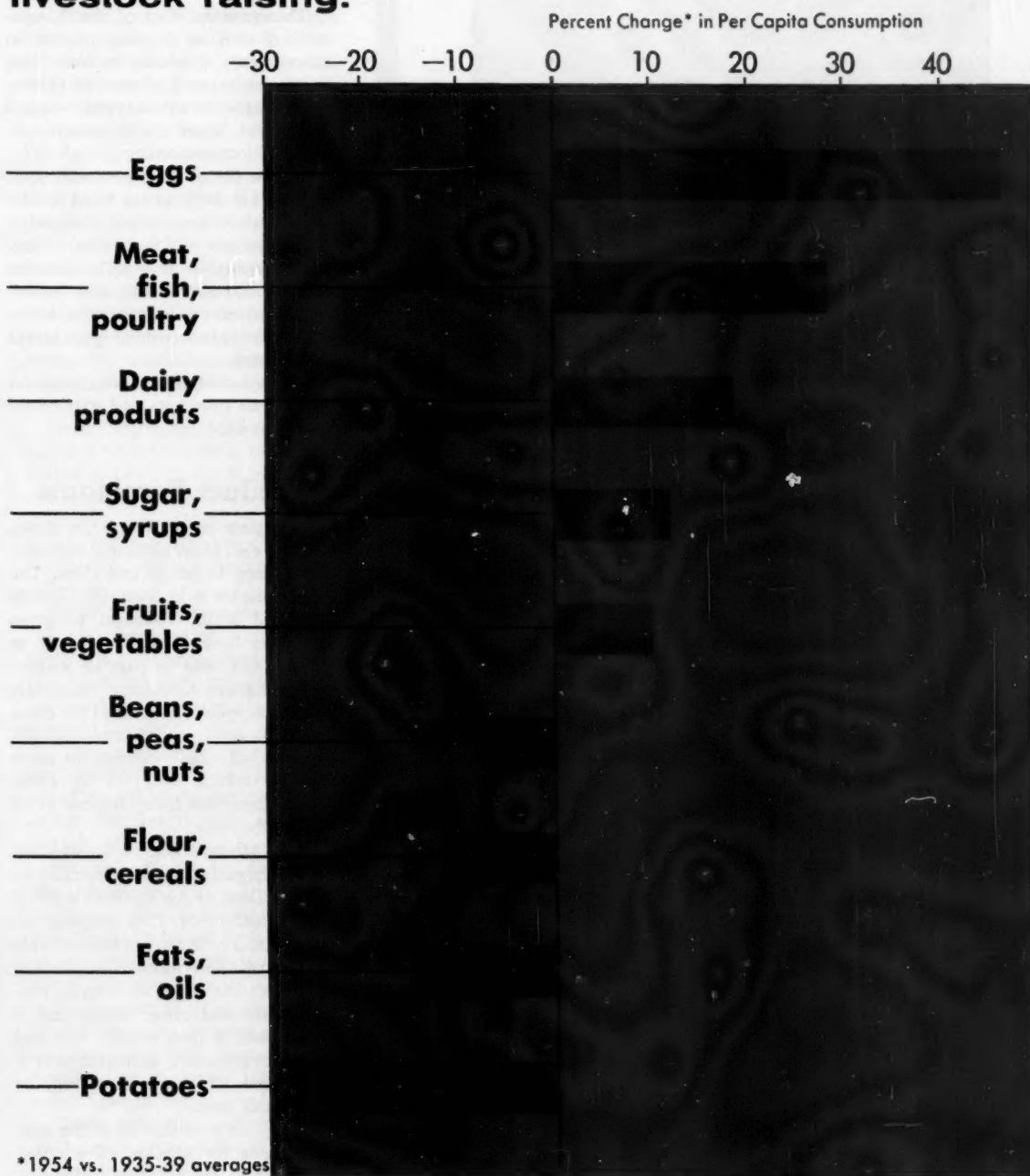
When added to a fly spray, a relatively small quantity of synergist—selling at only a fraction of the cost of pyrethrins or allethrin—will permit a four- to eightfold reduction in toxicant content without sacrificing product performance.



CHEMICAL REPRISAL: Today's answer to a mosquito-infested stream is potent, quick-knockdown larvicides.

CHANGES IN OUR EATING HABITS...

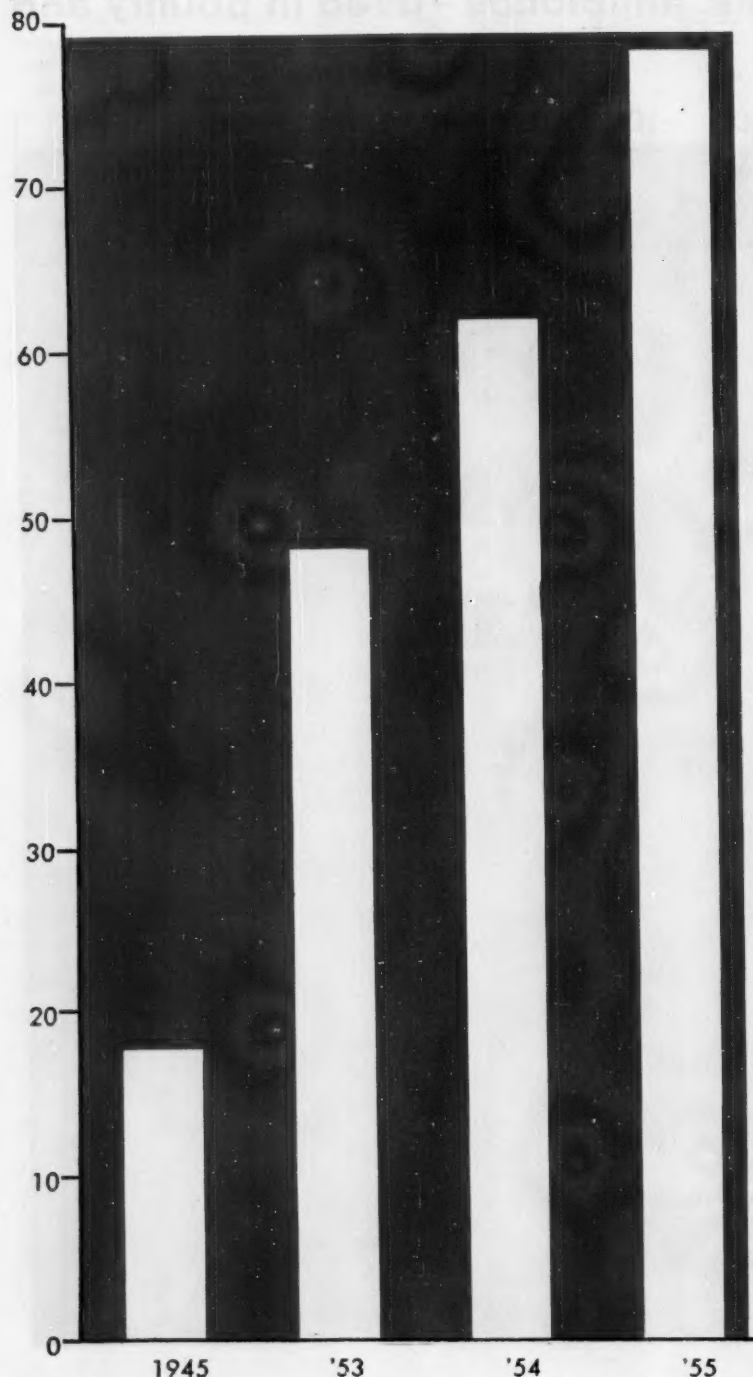
...are boosting protein-food intake, increasing the consumption of chemicals – insecticides, repellents, medicaments, antibiotics – used in poultry and livestock raising.



PESTICIDE EXPORTS

Steady gains in ten years.

(million dollars)



C W Report

Thiocyanates: Two of the thiocyanates finding a growing market in space sprays, primarily in controlling flying insects, are Lethane 384 (Rohm & Haas)—butoxythiocyano diethyl ether, and Thanite (Hercules)—isobornyl thiocyanacetate.

Largest use of these pesticidal compounds is in dairy sprays. Used in relatively high concentrations (compared with strength of pyrethrins), they knock down insects quickly. Because of their economy in use, they are replacing pyrethrins in many jobs. Other markets include household space sprays and aerosols.

Tables including additional data on insecticides from botanical sources are on pp. 64-65.

Product Fumigants

Fumigants are used in large, closed spaces—e.g., grain elevators, box cars, warehouses, buildings and ships. The largest market is in controlling insects in stored grain. Tonnages of grain fumigants have increased sharply in recent years, due in part to government programs to enforce cleanliness in grain supplies. As demand for clean foodstuffs soars, use of fumigants will also probably rise—perhaps to more than 60 million lbs./year by 1960. Use of fumigants today is close to 50 million lbs./year.

75-25 Mixture: One of the standard grain fumigants first recommended by the U.S. Dept. of Agriculture (in 1933) was a mixture of 75% ethylene dichloride and 25% carbon tetrachloride by volume. This mixture is effective against all life stages of weevils, beetles, moths and other insects and is widely used in farm storage bins and grain elevators. It's estimated that 1 million gal. of this mixture will be applied this year.

One recent modification of the mixture comes by addition of ethylene dibromide to the ethylene dichloride-

carbon tetrachloride combination. Advantage of this three-component mixture over the 75-25 mixture: lower dosages are required.

80-20 Mixture: But the largest tonnage of liquid grain fumigant marketed today is 80-20 mixture—80% carbon tetrachloride and 20% carbon bisulfide by volume. Carbon bisulfide is toxic to insects; carbon tetrachloride is added to render the mixture relatively nonflammable. Estimated application this year: 2.3 million gal.

Calcium Cyanide: Calcium cyanide's volatility and toxicity make it a valuable fumigant. On exposure to the natural moisture in air, it liberates hydrogen cyanide gas.

When calcium cyanide is mixed with grain flowing into bins, the hydrogen cyanide gas permeates the grain mass and kills the insects. The compound is also being sold to mills, mushroom houses, greenhouses and similar operations for controlling rodents as well as insects. In another fumigation application, porous discs impregnated with liquid hydrogen cyanide are used.

Methyl Bromide: Methyl bromide was first introduced as a fumigant in France in 1932. Today, it has attained status as one of the leading fumigant chemicals. At ordinary temperatures, it is a gas, but it liquefies easily and is also distributed commercially in cylinders.

Because methyl bromide is poisonous to warm-blooded animals, chloropicrin is sometimes added as a warning agent. Its high toxicity to many insect species makes methyl bromide a valued fumigant.

Large quantities of it are now being used to fumigate large elevators infested with Khapra beetle—an application that has received much publicity in recent months.

Khapra beetle was first discovered in the U.S. around 1953, in California. Being a particularly serious infestation, emergency measures were taken by the government in efforts to bring it under control quickly.

Warehouses as large as 4 million cu. ft. have been wrapped in vinyl or similar plastic film, then fumigated. Result: Khapra beetle infestation is being brought under control.

Grain, industrial and space fumigation details are included in the tables on pp. 78-79, 80-81.

How \$79.1 Million Worth of U.S. Pesticide Exports Were Distributed in 1955 . . .

The breakdown by world markets:

	(million dollars)
North America	\$34.5
South America	15.8
Asia	14.1
Europe	6.5
Africa	4.5
Caribbean	2.6
Others	1.1

Leading consumer countries accounted for half the export value:

Mexico	\$11.1
Canada	8.5
Brazil	5.2
India	4.5
Nicaragua	4.1
Colombia	3.3
Venezuela	3.0

Soil Fumigants

Treating soils for nematodes and soil-borne diseases is relatively new in agriculture. Within just 15 years, sales of fumigants for this purpose have bounced to an estimated \$12 million/year.

Chloropicrin has for the past 25 years been an effective nematode combatant. But, its relatively high cost

virtually limits its use to greenhouse soil treatment.

Currently, D-D mixture, ethylene dibromide and methyl bromide rank as the most important pesticide products for soil-treatment use, but because of the widespread interest in pesticides, hosts of new materials are coming onto the scene.

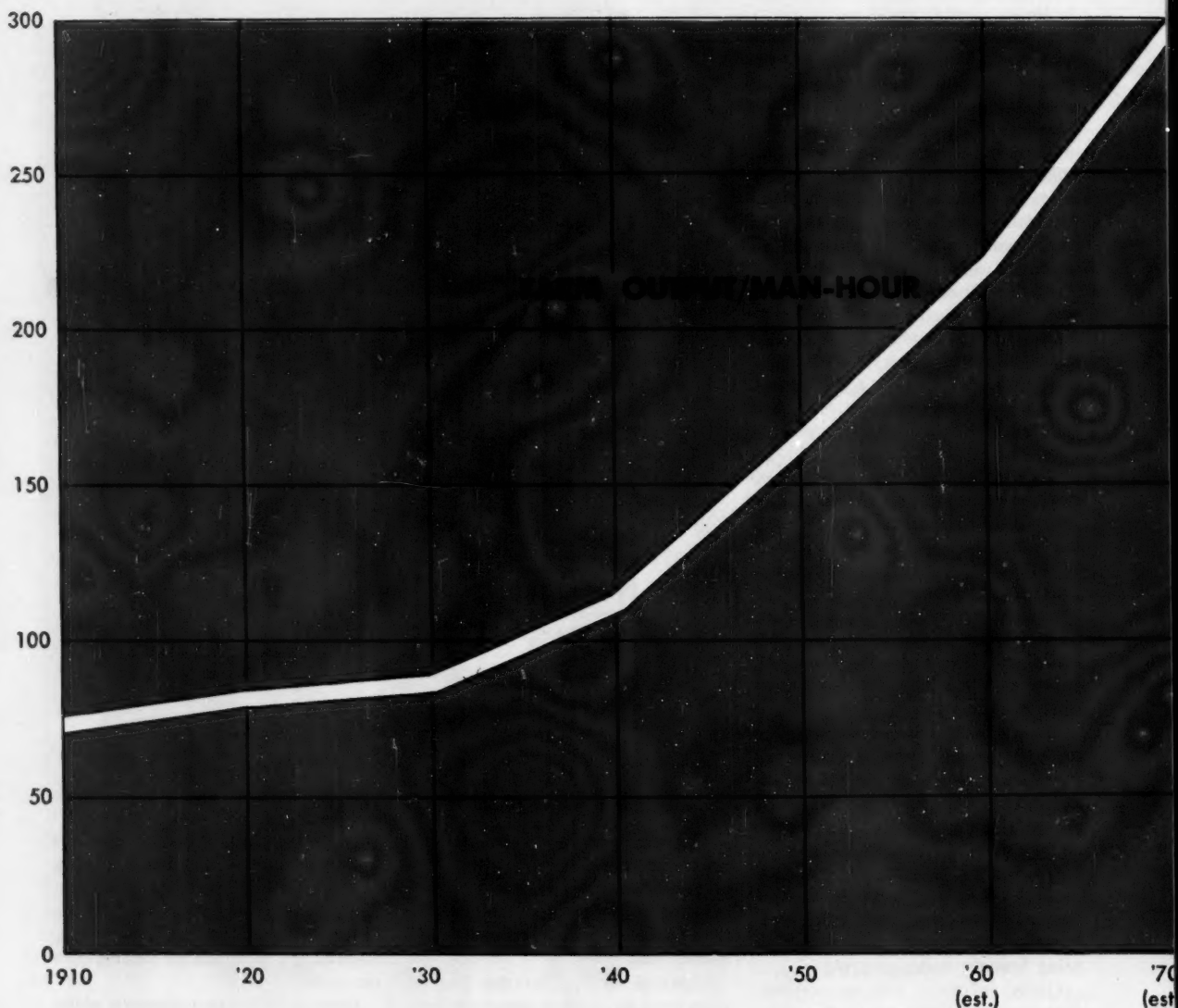
Leading agriculture scientists claim that the nation is just beginning to

FARM PRODUCTIVITY

Pesticides and fertilizers are behind hopes for a 54% gain

(over today's level) by 1970

Index
(1935-39 = 100)



realize the magnitude of the damage caused by various soil organisms. Nematodes and soil-borne diseases take huge tolls of crops each year. But research by federal and state experimental stations is continuously proving that substantial net gains can be achieved by control measures. As a result, farmers and the pesticide industry are being alerted to the importance of soil fumigants.

D-D Mixture: In 1945, agricultural experimenters in Hawaii published an account of their tests of a mixture of dichloropropenes and dichloropropanes in controlling nematodes on pineapple lands. Since that time, D-D mixture has become commercial (manufactured first by Shell; Dow markets it also, under the tradename Dowfume).

Ethylene Dibromide: Ethylene dibromide, in mixtures with ethylene dichloride and carbon tetrachloride, is finding about as many applications as a soil fumigant as it is in insect eradication. In fact, it currently competes with D-D mixture. Major uses include: control of nematodes on tobacco, citrus and certain vegetable crops.

Methyl Bromide: Besides its use as a product fumigant, methyl bromide is being applied as a gas for soil fumigation. Its use is limited to relatively small areas, such as in tobacco, celery and other seed beds; too, because of its toxicity, it must be applied under plastic covers. Nevertheless, 2-3 million lbs. of methyl bromide were applied in 1955, according to a recent government report.

Some promising new soil fumigants include Nemagon (Shell), V-C 13 (Virginia-Carolina), Terrachlor (Olin Mathieson), Vapam (Stauffer), and Mylone (Carbide). Some of these products—notably the latter two—will also control weeds.

Complete listings of soil fumigant and growth regulator products appear in the tables on pp. 82 through 87.



BOVINE BACK-RUBBER: 'Do-it-yourself' device dispenses insecticides.

Extensive research is under way in both agriculture and industry to combat such nematodes as sting, stubby root and dagger nematodes of citrus crops, and various nematodes attacking other fruit trees, ornamentals and small fruits. Also needed is further research in controlling nematodes that affect rice and soybeans and that stunt crops and perennial grass growth, including diseases such as Southern blight.

All these efforts to combat nematode losses, soil-borne diseases of crops and

all other pests appear to be adding up to one of the great achievements of the chemical process industries.

The third and concluding report on the pesticide industry will appear in the Nov. 17 issue of CHEMICAL WEEK. Organic and inorganic foliage fungicides, seed treatment fungicides, herbicides, brush killers, soil sterilants, defoliant and desiccants, and weed killers will be discussed, and the importance of the Miller bill to the pesticide industry will be examined.

AHEAD: Twenty tables containing key data on botanical source insecticides, dairy and livestock insecticides, repellents, grain, industrial and space fumigants, soil fumigants and growth regulators — products that contribute significantly to pesticide industry profits. Pages 64 to 68 and pp. 73 to 87.

Leading Pesticide Producers

Company	Abbreviation	Address
Abbott Laboratories	Abbott	14th St. & Sheridan Rd., North Chicago, Ill.
Allied Chemical & Dye	Allied Chem.	40 Rector St., New York 6, N.Y.
American Agricultural Chemical	Amer. Ag.	50 Church St., New York 7, N.Y.
American Chemical Paint	ACP	Ambler, Pa.
American Cyanamid Ind. Chem. Div.	Amer. Cy.	30 Rockefeller Plaza, New York 21, N.Y.
American Potash & Chemical	Amer. Pot.	3030 W. 6th St., Los Angeles 54, Calif.
Arapahoe Chemicals	Arapahoe	2800 Pearl St., Boulder, Colo.
J. T. Baker Chemical	Baker	Phillipsburg, N.J.
Benzol Products	Benzol	237 South St., Newark 5, N.J.
B&G Co.	B&G	4725 Rising Sun Ave., Philadelphia 20, Pa.
Berkshire Chemical	Berkshire Chem.	420 Lexington Ave., New York 17, N.Y.
Brothers Chemical	Brothers	575 Forest St., Orange, N.J.
California Spray-Chemical	Calspray	Lucas & Ortho Way, Richmond, Calif.
Carbide and Carbon Chemicals Division	Carbide	30 E. 42nd St., New York 17, N.Y.
Central Chemical Corp of Maryland	Central	49 N. Jonathan St., Hagerstown, Md.
Chemagro	Chemagro	101 Park Ave., New York 17, N.Y.
Chemley Products	Chemley	14 E. Jackson Blvd., Chicago 4, Ill.
Chipman Chemical	Chipman	P.O. Box 309, Bound Brook, N.J.
W. A. Cleary	Cleary	P.O. Box 749, New Brunswick, N.J.
Commercial Solvents	Comm. Solv.	260 Madison Ave., New York 16, N.Y.
Delta Chemical Works	Delta Chem.	23 W. 60th St., New York 23, N.Y.
Diamond Alkali	Dia. Alk.	300 Union Commerce Bldg., Cleveland
Distillation Products Industries Div., Eastman	Dist. Prod.	755 Ridge Rd., W., Rochester 3, N.Y.
Dow Chemical	Dow	Midland, Mich.
E.I. du Pont de Nemours	Du Pont	10th & Market Sts., Wilmington 98, Del.
Fairfield Chemical Division, FMC	Fairfield	420 Lexington Ave., New York 17, N.Y.
Fairmount Chemical Co.	Fairmount	600 Ferry St., Newark 5, N.J.
Food Machinery & Chemical	Food Mach.	161 E. 42nd St., New York 17, N.Y.
Frontier Chemical	Frontier	321 W. Douglas, Wichita, Kan.
Gallard-Schlesinger Chemicides	Gallard-Schlesinger	37-11 29th St., Long Island City 1, N.Y.
Gallowhur Chemical	Gallowhur	801 2nd Ave., New York 17, N.Y.
Geigy Industrial Chemicals, Div., Geigy	Geigy	89 Barclay St., New York 8, N.Y.
General Chemical Division, Allied	Gen. Chem.	40 Rector St., New York 6, N.Y.
B. F. Goodrich Chemical	Goodrich	2060 E. 9th St., Cleveland 15, O.
Hercules Powder	Hercules	978 Market St., Wilmington 99, Del.
Heyden Chemical	Heyden	342 Madison Ave., New York 17, N.Y.
Hooker Electrochemical	Hooker	4715 Buffalo Ave., Niagara Falls, N.Y.
Irvington Varnish & Insulator Div., 3M	Irvington	6 Argyle Terrace, Irvington 11, N.J.
Jefferson Chemical Co.	Jefferson	260 Madison Ave., New York 16, N.Y.

Kolker Chemical Koppers Co.	Kolker Koppers	600 Doremus Ave., Newark 5, N.J. Koppers Bldg., Pittsburgh 19, Pa.
Larvacide Products	Larvacide	117 Liberty St., New York, N.Y.
Lebanon Chemical	Lebanon	P.O. Box 532, Lebanon, Pa.
Los Angeles Chemical	L.A. Chem.	1960 Sante Fe Ave., Los Angeles 21, Calif.
Mallinckrodt Chemical Works	Mallinckrodt	Second & Mallinckrodt Sts., St. Louis 7, Mo.
Matheson Coleman & Bell Division	Math. Coleman	932 Paterson Plank Rd., E. Rutherford, N.J.
McLaughlin Gormley King	MGK	1715 S.E. 5th St., Minneapolis 14, Minn.
Merck	Merck	Lincoln Ave., Rahway, N.J.
Michigan Chemical	Mich. Chem.	500 N. Bankson St., St. Louis, Mich.
Miller Chemical & Fertilizer	Miller	2226 N. Howard St., Baltimore 18, Md.
Monsanto Chemical	Monsanto	710 N. 12th Blvd., St. Louis 1, Mo.
Montrose Chemical	Montrose	120 Lister Ave., Newark 5, N.J.
Mountain Copper	Mountain	230 California St., San Francisco 11, Calif.
Naugatuck Chemical Div., U.S. Rubber	Naugatuck	203 Elm St., Naugatuck, Conn.
New York Quinine & Chemical Works	N.Y. Quinine	50 Church St., New York 7, N.Y.
Niagara Chemical Div., FMC	Niagara	100 Niagara St., Middleport, N.Y.
Olin Mathieson Chemical	Olin Math.	Baltimore 3, Md.
Pacific Coast Borax	Pacific Coast	630 Shatto Pl., Los Angeles 5, Calif.
S. B. Penick	Penick	50 Church St., New York 7, N.Y.
Pennsylvania Salt Mfg.	Penn Salt	3 Penn Center Plaza, Philadelphia 2, Pa.
Phelps-Dodge Refining	Phelps-Dodge	40 Wall St., New York 5, N.Y.
Pittsburgh Coke & Chemical	Pitts. Coke	1905 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Plate Glass	Pitts Pl.	1 Gateway Center, Pittsburgh 22, Pa.
John Powell, Division, Olin Mathieson	Powell	1 Park Ave., New York 16, N.Y.
Prentiss Drug & Chemical	Prentiss	110 William St., New York 38, N.Y.
Reilly Tar & Chemical	Reilly	1615 Merchant Bank Bldg., Indianapolis
Ringwood Chemical	Ringwood	120 S. LaSalle St., Chicago 3, Ill.
Rohm & Haas	Rohm & Haas	712 Locust St., Philadelphia 5, Pa.
Shell Chemical	Shell	380 Madison Ave., New York 17, N.Y.
Sherwin-Williams	Sherwin-Wms.	100 Park Ave., New York 17, N.Y.
Standard Agricultural Chemicals	Standard Ag.	1301 Jefferson St., Hoboken, N.J.
Stauffer Chemical	Stauffer	480 Madison Ave., New York 17, N.Y.
Tennessee	Tennessee	619 Grant Bldg., Atlanta 1, Ga.
United States Industrial Chemical	USI	99 Park Ave., New York 16, N.Y.
Velsicol	Velsicol	330 E. Grand Ave., Chicago 11, Ill.
Virginia-Carolina Chemical	Virginia-Carolina	401 E. Main St., Richmond 8, Va.
Winthrop-Stearns	Winthrop-Stearns	1450 Broadway, New York 18, N.Y.
Woolfolk Chemical Works	Woolfolk	East Main St., Fort Valley, Ga.
Wyandotte Chemical	Wyandotte	Wyandotte, Mich.

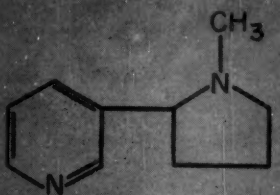
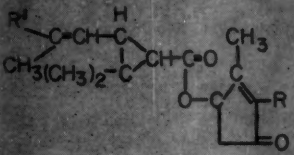
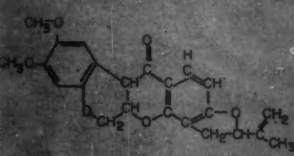
NOTES ABOUT THE TABLES

● The following 22 pages of tables represent a careful collation of pesticide industry data from many sources. In some instances, figures are those of the author.

● Abbreviations used under the heading **Principal Formulations**: WP—wetttable powder; EC—emulsifiable concentrate; D—dust; S—solution.

● **Annual Sales, Sales Price and Total Sales Value** columns represent available data. In many instances, data could not be obtained, or the author was ad-

INSECTICIDES FROM

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
nicotine sulfate	Dia. Alk. "Black Leaf 40"	3-(1-methyl-2-pyrrolidyl) pyridine		colorless liquid b.p. 247.3 C
pyrethrins	Fairfield MGK Penick Powell Prentiss	mixed esters of pyrethrolone and cinerolone keto-alcohols and two chrysanthemum acids		liquids unstable to alkalis and light
rotenone	Fairfield Penick Powell Prentiss	cube and derris, both whole root and powdered		solid m.p. 163 C
ryania	Penick "Ryanicide 100"	ryanodine	$C_{28}H_{42}NO_3$ or $C_{28}H_{41}NO_3$	extractable with methanol and chloroform
sabadilla	Penick Powell Prentiss	mixture of alkaloids known as veratrine	not known	melting range 140-150 C soluble in org. solvents

vised by chemical companies that the data was confidential. **Sales Prices** are on a contained basis computed from a principal ready-to-use formulation available at retail. Due to differences in formulations, freight rates, and many other variables, these prices are, at best, rough guides.

● **Acute oral toxicity** figures indicate the relative acute oral toxicity of pesticide chemicals to laboratory animals. "LD₅₀," of course, refers to the number of milligrams of chemical per kilogram of body weight of laboratory animals tested (usually rats), a single dose of which killed half of the animals

tested. The higher the LD₅₀ value, the lower the pesticide toxicity.

● Two points about toxicity must be emphasized: (1) expert judgment is needed to translate acute oral toxicity figures into meaningful data for humans; (2) acute oral toxicity relates to handling hazards, not to long-term toxicity. Therefore, it has little bearing on safety of pesticide residues.

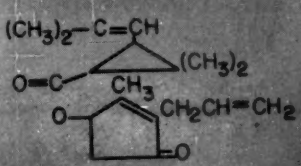
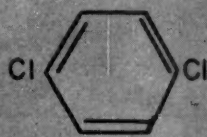
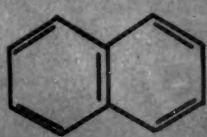
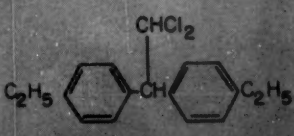
● **Major End-Uses** listed in the tables represent common knowledge, advice from manufacturers or, in some instances, the author's observations.

BOTANICAL SOURCES

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* (\$/lb.)	Total Sales Value* (\$1,000)	Acute Oral Toxicity LD ₅₀ mg./kg.	Major End-Uses
solvent extraction (trichloroethylene) in presence of alkali followed by extraction from solvent by dilute H ₂ SO ₄	40% S	500	3.00	1,500	55	apples, apricots, strawberries, cucurbits, certain other fruits and vegetable crops also on ornamentals home gardens
grinding of extraction of dried <i>Chrysanthemum cineræfolium</i> flowers	20% conc. extract 0.3-5% S and EC 1% D aerosols (usually with synergist)	100	55.00	5,500	200	stored grains on growing crops dairy and household insects
extraction from <i>Derris elliptica</i> or <i>Lonchocarpus</i> sp.	5% powder EC	6,000	0.29	1,740	132	on vegetable crops insect pests of man and animals
extracted from stem wood of <i>Ryania speciosa</i> , a tropical shrub of Trinidad	100% powder 40% D	600	0.27	150	750	sugar cane, cranberries, apples, corn
treatment of sabadilla seeds with soda ash	10-20% D	—	0.42	—	4,000	vegetable crops

*Approximate figures.

DAIRY AND LIVESTOCK INSECTICIDES,

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
allethrin	Benzol Fairfield	dl-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one esterified with a mixture of cis and trans dl-chrysanthemum monocarboxylic acids	 $(CH_3)_2-C=CH$ $O=C-CH_3$ $O-CH_2CH=CH_2$	pale-yellow liquid sp. g. 1.005
butoxy-polypropylene glycol	Carbide "Crag"	butoxypolypropylene glycol	$C_4H_9O-(CH_2-CH-O)_nH$ CH_3	colorless liquid vapor pressure at 30 0.001 mm. sp. g. 0.990
p-di-chloro-benzene	Allied Chem. Monsanto Dow Pitts. Plate Du Pont Hooker	p-dichlorobenzene		colorless crystals m.p. 56 C stable
"Lethane"	Rohm & Haas "Lethane 384"	2-butoxy-2'-thiocyanodiethyl ether	$C_4H_9OC_2H_4OC_2H_4SCN$	brownish oil soluble in org. solvent
naphthalene	Allied Amer. Cy. Du Pont Koppers Reilley Sher.-Wms.	naphthalene		white crystalline solid m.p. 80 C flammable
"Perthane"	Rohm & Haas "Perthane"	1,1-dichloro-2,2-bis(p-ethylphenyl)ethane		cream to tan semisolid m.p. 40 C

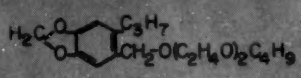
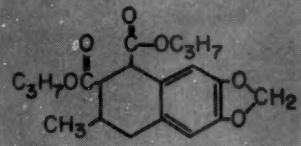
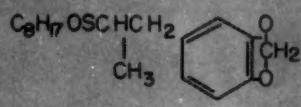
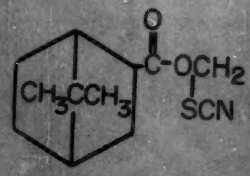
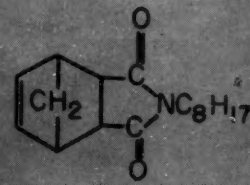
†See also Chlorinated and Phosphorus Insecticides (part 1 of this report) and Insecticides from Botanical Sources (p. 64).

REPELLENTS; HOUSEHOLD INSECTICIDES (I)[†]

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* (\$/lb.)	Total Sales Value* (\$1,000)	Acute Oral Toxicity LD ₅₀ , mg./kg.	Major End-Uses
condensation of chrysanthemum monocarboxylic acid with 2 -allyl -4 -hydroxy -3 -methyl-2-cyclopentene-1-one	20% S aerosols	20	32.00	640	680	on growing crops in household and space sprays and aerosols
addition of propylene oxide to butanol	100% for formulation in oil or water-base sprays	—	0.30	—	11,200	in dairy and livestock formulations to add repellency towards biting flies
chlorination of benzene	100%	5,000	0.18	900	—	fumigant against household insects
reaction of metal thiocyanate with butoxyethoxy ethyl chloride	50% S aerosols	—	1.00	—	90	dairy and livestock sprays household insects (aerosols)
separated out of coal tar	100%	15,000	0.155	2,325	—	control of clothes moths, carpet beetles and household insects
reaction of ethyl benzene with dichloroacetaldehyde	50% WP 4 lbs./gal. EC	—	0.67	—	8,500	household insects promising for dairy sprays and on certain crops

*Approximate figures.

DAIRY AND LIVESTOCK INSECTICIDES, REPELLENTS; HOUSEHOLD INSECTICIDES (II)[†]

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
piperynyl butoxide	Fairfield	product containing as its principal constituent α -[2-(2-butoxyethoxy)-ethoxy]-4,5-methylenedioxy-2-propyltoluene		pale-yellow liquid b.p. 180 C at 1 mm. sp. g. 1.06
propyl isome	Penick	di-n-propyl-1,2,3,4,-tetrahydro-3-methyl-6,7-methylenedioxy-1,2-naphthalene dicarboxylate		viscous amber liquid sp. g. 1.14
"Stro-bane"	Goodrich "Strobane"	terpene polychlorinates (66% chlorine)	not known	straw-colored liquid sp. g. 1.60
"Sulf-oxide"	Penick "Sulfoxide"	n-octyl sulfoxide of isosafrole		brown liquid sp. g. 1.07 9.0 lbs./gal.
"Thanite"	Hercules "Thanite"	min. of 82% isobornyl thiocyanacetate and a max. of 18% other active terpenes		clear amber liquid sp. g. 1.1465 9.18 lbs./gal. camphor odor
264	MGK "MGK 264"	N-(2-ethylhexyl) bicyclo[2.2.1]-5-heptene-2,3-dicarboximide		liquid b.p. 158 C at 2 mm. sp. g. 1.05

[†]See also Chlorinated and Phosphorus Insecticides (part 1 of this report) and Insecticides from Botanical Sources (p. 64).

Continued on p. 73

Designing?



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DAIRY AND LIVESTOCK INSECTICIDES, REPELLENTS; HOUSEHOLD INSECTICIDES (II)[†]

Continued from p. 68

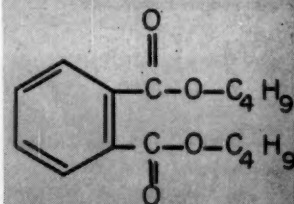
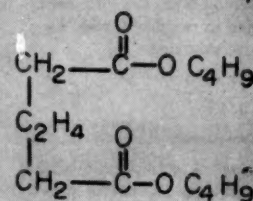
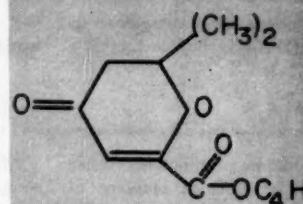
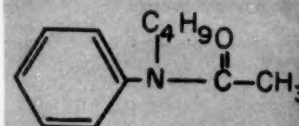
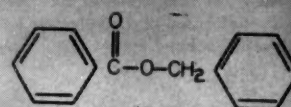
Manufacturing Process	Principal Formulations	Annual Sales (1,000 lb.)	Sales Price (\$/lb.)	Total Sales Value (\$1,000)	Acute Oral Toxicity LD ₅₀ mg./kg.	Major End-Uses
reaction of chloromethyl derivative of dihydroisofrole with sodium salt of diethylene glycol monobutyl ether	50 and 5% in concentrates for dilution in oil or water (pyrethrins synergist)	—	4.50	—	11,500	pyrethrins and allethrin synergist stored grain pests vegetables
condensation of isofrole with n-propyl maleate	5% S mixtures with pyrethrins	—	1.50	—	15,000	on growing crops pyrethrins and allethrin synergist
chlorination of terpenes to approx. 66% chlorine content	2% in oil sprays and aerosols	—	—	—	200	household insects
addition of n-octylmercaptan to isofrole in presence of ultraviolet light; the thio ether formed is oxidized with hydrogen peroxide	40% S mixtures with pyrethrins	—	4.50	—	2,000	on growing crops pyrethrins, allethrin synergist; used in dairy, household and industrial insecticides
reaction of chloroacetic acid with secondary alcohol of pine oil with sodium thiocyanate	100%	—	0.54	—	1,000	dairy and household insects
reaction of ethyl hexyl amine with condensation product of cyclopentadiene and maleic anhydride	used in mixtures with synergized pyrethrins, thiocyanates and other toxicants in sprays and aerosols	—	1.65	—	2,800	on growing crops pyrethrins, allethrin synergist in household aerosol, space and dairy sprays and stored grain insect control

See also Chlorinated and Phosphorus Insecticides (part 1 of this report) and Insecticides from Botanical Sources (p. 64).

REPEL

Product	Leading Producers and Trademarks	Chemical Name or Definition
benzyl benzoate	Merck Monsanto Montrose	benzyl benzoate
N-butyl acetanilide	Carbide Dow	N-butyl acetanilide
butyl mesityloxide oxalate	USI "Indalone"	2,2-dimethyl-6-carbobutoxy- 2,3-dihydro-4-pyrone
dibutyl adipate	Carbide	dibutyl adipate
dibutyl phthalate	Food Mach. Monsanto Comm. Solv. Pitts. Coke USI Du Pont Montrose Allied Chem.	dibutyl phthalate

Formula



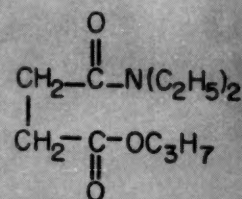
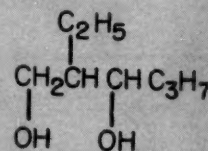
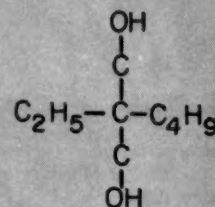
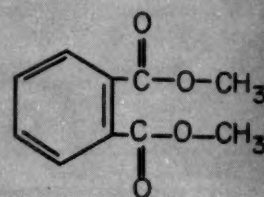
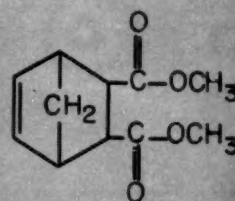
LENTS (I)

Physical Properties	Manufacturing Process	Acute Oral Toxicity LD ₅₀ mg. kg.	Major End-Uses
oily liquid m.p. 21 C b.p. 323-324 C sp. g. 1.11	reaction of sodium benzylate with benzaldehyde	1,900	repels fleas, chiggers and mites; used as clothing impregnant
m.p. 22 C b.p. 277-281 C sp. g. 0.99	reaction product of aniline, butyl chloride and acetic anhydride	2,830	repels ticks and fleas; used as clothing impregnant
oily liquid b.p. 113 C sp. g. 1.06	condensation of mesityl oxide with dibutyl oxalate in presence of sodium ethoxide	7,800	impregnating clothing; used in mixtures
colorless liquid b.p. 183 C at 14 mm. sp. g. 0.965	esterification of butanol with adipic acid	12,900	repels American dog tick, Lone Star tick and chiggers; used experimentally as clothing impregnant and on dogs
colorless liquid b.p. 340 C sp. g. 1.05	esterification of butanol with phthalic anhydride	> 21,000	chigger repellent; used on clothing

REPEL

Product	Leading Producers and Trademarks	Chemical Name or Definition
dimethyl carbate	Carbide	cis-bicyclo (2.2.1)-hept-5-ene-2,3-dicarboxylic acid
dimethyl phthalate	Monsanto Du Pont Allied Chem.	dimethyl phthalate
ethyl butyl propanediol	Carbide	2-ethyl-2-butyl-1,3-propanediol
ethyl hexanediol	Carbide "6-12"	2-ethyl-1,3-hexanediol
propyl diethyl-succinamate		n-propyl-N,N-diethylsuccinamate

Formula



LENTS (II)

Physical Properties	Manufacturing Process	Acute Oral Toxicity LD ₅₀ , mg/kg.	Major End-Uses
m.p. 70 C sp. g. 1.183	esterification with methanol of the reaction product of cyclopentadiene with maleic anhydride	1,000	used in mixtures to repel subarctic species of mosquitoes
colorless liquid b.p. 282-285 C sp. g. 1.194	esterification of methanol with phthalic anhydride	8,200	repels mosquitoes, chiggers; used in mixtures
m.p. 40-42 C sp. g. 0.931	hydrogenation of reaction product of formaldehyde and ethyl hexaldehyde	5,040	used in Formula M-1960, a clothing treatment to repel several kinds of insects
colorless liquid b.p. 244 C sp. g. 0.9422	hydrogenation of butyraldol	2,400	applied direct to skin to repel mosquitoes, chiggers, black flies, sand fleas and gnats
sp. g. 1.01	reaction of succinic anhydride with diethylamine followed by esterification with n-propanol	6,400	particularly effective in repelling subarctic species of mosquitoes

GRAIN, INDUSTRIAL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties	Man
acrylonitrile	Amer. Cy. Carbide Monsanto	acrylonitrile	$\text{CH}_2=\text{CHC}\equiv\text{N}$	colorless liquid b.p. 77.3-77.5 C sp. g. 0.801 flash point 4 C exp. limit 3.05-17% vol.	ction th HC
calcium cyanide	Amer. Cy. "Cyanogas"	calcium cyanide	$\text{Ca} \begin{cases} \text{C}\equiv\text{N} \\ \text{C}\equiv\text{N} \end{cases}$	grey granular powder decomposed by moisture to give hydrogen cyanide	ction th calo
carbon bisulfide	Stauffer Food Mach. Baker	carbon bisulfide	$\text{S}=\text{C}=\text{S}$	colorless liquid b.p. 46.3 C sp. g. 1.263 flash point approx. 20 C vapor ignites spont. 125-135 C	ction ke
carbon tetrachloride	Amer. Cy. Dow Stauffer Dia. Alk. Food Mach.	carbon tetrachloride	$\begin{array}{c} \text{Cl} \\ \\ \text{Cl}-\text{C}-\text{Cl} \\ \\ \text{Cl} \end{array}$	colorless liquid b.p. 77 C nonflammable	orinat e

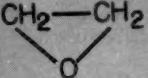
AND SPACE FUMIGANTS (I)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lbs.)	Sales Price* (\$/lb.)	Total Sales Value* (\$1,000)	Acute Oral Toxicity LD ₅₀ , mg./kg.	Major End-Uses
Reaction of ethylene oxide with HCN	34% acrylonitrile 66% carbon tet.	—	0.31	—	93	stored grain and tobacco fumigant
Reaction of sodium chloride with calcium cyanamide	100% D	—	0.27	—	—	control of citrus scale, greenhouse, grain mill, and household insects
Reaction of sulfur vapor with ke	20% carbon bisulfide 80% carbon tet.	6,000	0.09	540	—	stored grain fumigation
Chlorination of carbon bisulfide	80% carbon tet. 20% carbon bisulfide 25% carbon tet. 75% ethylene dichloride	32,000	0.135	4,320	7,460	stored grain and industrial fumigant and to reduce flammability of grain fumigant mixtures

*Approximate figures



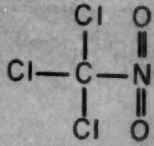
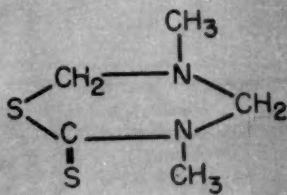
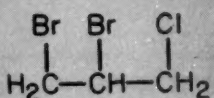
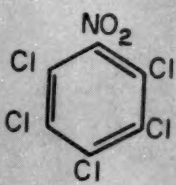
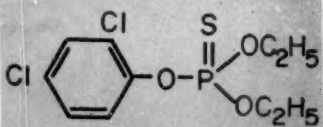
GRAIN, INDUSTRIAL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties	Ma
cyanide	Amer. Cy. "Liquid HCN" "HCN Discoids"	hydrogen cyanide	$\text{H}-\text{C}\equiv\text{N}$	colorless gas b.p. 26 C sp. g. 0.6876	action cyanid
ethylene dibromide	Amer. Pot. Dow Food Mach.	1,2-dibromoethane	$\text{BrCH}_2\text{CH}_2\text{Br}$	colorless liquid b.p. 131.5 C nonflammable sp. g. 2.172	bromin
ethylene dichloride	Carbide Dia. Alk. Dow Jefferson Olin Math. Wyandotte	1,2-dichloroethane	$\text{ClCH}_2\text{CH}_2\text{Cl}$	colorless liquid b.p. 83.5 C sp. g. 1.2569 burns with difficulty	chlorin
ethylene oxide	Allied Chem. Carbide Dow Jefferson Olin Math.	ethylene oxide	CH_2-CH_2 	colorless gas b.p. 10.7 C sp. g. 0.89 flammable	oxida
methyl bromide	Amer. Pot. Dow Kolker Mich. Chem.	bromomethane	CH_3Br	colorless gas b.p. 3.56 C nonflammable sp. g. 1.73	reacti with

AND SPACE FUMIGANTS (II)

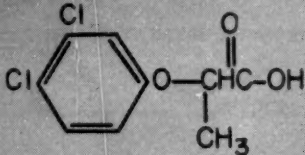
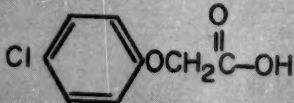
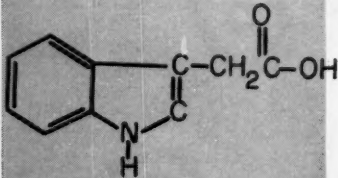
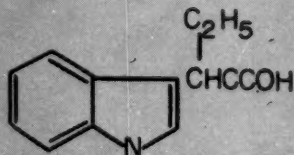
Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lbs.)	Sales Price* (\$/lb.)	Total Sales Value* (\$1,000)	Acute Oral Toxicity LD ₅₀ mg./kg.	Major End-Uses
Reaction of moisture on calcium cyanide	100% liquefied gas	—	0.75	—	—	stored grain, industrial and household fumigant
Bromination of ethylene	20% ethylene dibromide 20% ethylene dichloride 60% carbon tet.	—	—	—	146	stored grain fumigant
Chlorination of ethylene	75% ethylene dichloride 25% carbon tet.	10,000	0.12	1,200	770	grain fumigant and industrial fumigant
Oxidation of ethylene	10% ethylene oxide 90% carbon dioxide	—	0.16	—	330	industrial fumigant
Reaction of methanol with H Br	98% methyl bromide 2% chloropicrin	6,000	0.46	2,760	—	stored grain, cottonseed, greenhouse and stored and fresh food products fumigant

*Approximate figures.

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
chloropicrin	Larvacide Prod. "Larvacide" Dow "Picfume"	1,1,1-trichloro-1-nitromethane		colorless liquid b.p. 112.4 C sp. g. 1.692 nonflammable
"D-D"	Shell "D-D" Dow "Dowfume N"	Mixture of isomers of 1,3-dichloropropene and 1,2-dichloropropane	$\text{CHCl}=\text{CHCH}_2\text{Cl}$ and $\text{CH}_2\text{Cl}-\text{CHCl}-\text{CH}_3$	black volatile liquid boiling range 50-115 C 10 lbs./gal.
ethylene dibromide	(see table on Grain,	Industrial and Space Fumigants)		
methyl bromide	(see table on Grain,	Industrial and Space Fumigants)		
"Mylone"	Carbide "Crag" "Mylone"	3,5-dimethyl-1,3,5,2H-tetrahydrothiadiazine-2-thione		crystalline solid tech. grade m.p. 99.5 C recryst. m.p. 105 C
"Nemagon"	Shell "Nemagen"	1,2-dibromo-3-chloropropane		liquid b.p. 196 C 17.3 lbs./gal.
PCNB	Olin Math. "Terrachlor"	pentachloronitrobenzene		light buff to white solid insoluble in water soluble in acetone, xylene
vapam	Stauffer	sodium-N-methyl dithiocarbamate dihydrate	$\text{CH}_3\text{NHC}(=\text{S})_2\text{S}-\text{Na} \cdot 2\text{H}_2\text{O}$	white crystalline solid readily soluble in water
"V-C 13"	Virginia-Carolina "V-C 13"	o-(2,4-dichlorophenyl)-o,o-diethyl phosphorothionate		straw-colored liquid

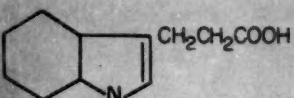
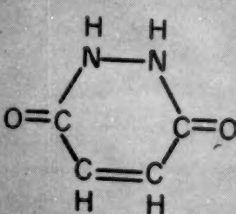
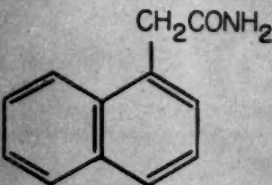
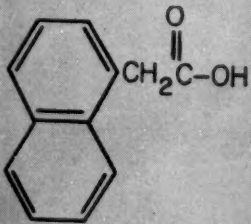
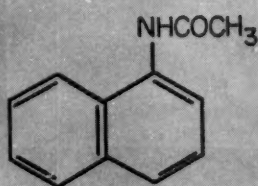
FUMIGANTS

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD ₅₀ mg./kg.	Major End-Uses
Reaction of hypochlorite and steam on calcium picrate	100%		controlling nematodes, insects, fungi, bacteria and weeds in greenhouse soils
Obtained from production of allyl chloride from propylene and chlorine	100%	140	nematodes in tobacco, pineapple, citrus and certain vegetable crops
Reaction product of carbon bisulfide, methyl amine and caustic soda	85% WP	500	a soil fungicide, nematocide and weed killer for use in ornamentals; appears promising in tobacco and vegetable seed beds
Bromination of allyl chloride	EC 10% granules	173	nematocide for use in cotton; vegetables; appears promising in grapes, citrus, peaches, walnuts and figs
Chlorination of nitrobenzene	75% WP 2 lbs./gal. EC 40% D 20% D 10% D		club root and black root of cabbage, cauliflower, broccoli, Brussels sprouts damping-off of cotton crown rot, black rot, stem rot, flower blight of certain ornamentals
Reaction product of methyl amine, carbon bisulfide, caustic soda and water	4 lbs./gal. S	820	soil fungicide, nematocide and herbicide for use in seed beds, potting soil, ornamentals, turf and nonedible field crops
Reaction product of diethyl chlorophosphonate and 2,4-dichlorophenol	75% EC		control of nematodes in turf, plant beds, ornamentals, potted plants and potting soil

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties	M
2-(2,4,5-Tp)	Dow "Color Set" ACP "Fruitone T" Gen. Chem. "Sta-fast"	2-(2,4,5-trichlorophenoxy) propionic acid		clear amber liquid	action phenate acid
chloro-phenoxy acetic acid	Dow "Sure Set"	p-chlorophenoxyacetic acid			action th mon
ethylene	Carbide	ethylene	$\text{CH}_2 = \text{CH}_2$	gas b.p. -103.8 C	parated
indole acetic acid	Winthrop-Stearns	3-indoleacetic acid		m.p. 166-168 C	parated acid
indole butyric acid	Arapahoe	2-(3-indole) butyric acid		m.p. 122-124 C	parated lorob

REGULATORS (I)

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD ₅₀ , mg./kg.	Major End-Uses
Reaction of sodium-2,4,5-trichlorophenolate with alpacchloropropionic acid	10.6% S		prevent preharvest apple drop
Reaction of sodium- <i>p</i> -chlorophenolate with monochloroacetic acid	0.16% EC		prevent preharvest fruit drop
Prepared from natural gas	100%		used to accelerate the coloring of bananas, citrus, melons and for blanching celery, endive and other vegetables
Prepared from indole and chloroacetic acid			naturally occurring growth regulator
Prepared from indole and alpha-chlorobutyric acid			rooting of cuttings

Product	Leading Producers and Trademarks	Chemical Name or Definition	Structural Formula	Physical Properties
indole propionic acid	Carbide	3-indolepropionic acid		
MH	Naugatuck	1,2-dihydro-pyridazine-3,6-dione		colorless crystals m.p. 296-298 slightly soluble in water
naphthalene acetamide	ACP "Amid-Thin"	1-naphthalene acetamide		m.p. 183 C
naphthalene acetic acid	ACP "Fruitone"	1-naphthalene-acetic acid		m.p. 130 C
naphthyl acetamide	ACP "Roctone" "Amid-Thin W"	N-1-naphthylacetamide		colorless crystals m.p. 156 C

REGULATORS (II)

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD ₅₀ mg./kg.	Major End-Uses
prepared from indole and acrylonitrile	butoxyethoxy propyl ester containing 4 lbs. acid per gallon		promising growth regulator
reaction of maleic anhydride with hydrazine	diethanolamine and sodium salts		inhibits grass growth, controls wild onions and quack grass; prevents tobacco suckering and storage-sprouting of onions and potatoes
hydrolysis of 1-naphthyl acetonitrile			thinning apples
reaction naphthalene with acetylchloride followed by Willgerodt reaction with ammonium polysulfide			growth stimulant
1-naphthylamine with acetic anhydride	0.02% IWP 8.4% WP		rooting of cuttings thinning apples

Single-copy reprints of this second of three reports on pesticides will be available at 50¢/copy. The first (CW, Oct. 27) and the forthcoming third installment (CW, Nov. 17) may be obtained at the same price. Single copies of the entire report—all three parts—may be had for \$1.50. Bulk prices on orders of more than 10 copies are available on request.

TWO AWAY — ONE TO GO

Complete coverage of the complex pesticide industry would fill a book,—which is why this CW report requires three installments to present.

The first report installment appeared last week (CW, Oct. 27), treated chlorinated insecticides, phosphorus insecticides, miticides, inorganic insecticides and rodenticides. Significant economic trends in the pesticide industry were also discussed.

This issue carries the second installment in the series, covers botanical source insecticides, dairy and livestock insecticides, repellents, grain, industrial and space fumigants, soil fumigants and growth-regulator chemicals—all important contributors to pesticide industry profits and future growth.

Two weeks hence (CW, Nov. 17), the concluding section will cover organic and inorganic fungicides, seed-treatment fungicides, herbicides, brush killers, soil sterilants, defoliants and desiccants.

The third installment will deal with pesticide industry problems and the impact of the Miller bill (legislation that became effective July of this year) on the industry's outlook.

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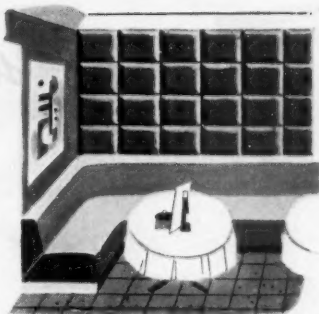
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PROBLEM: STABILIZATION

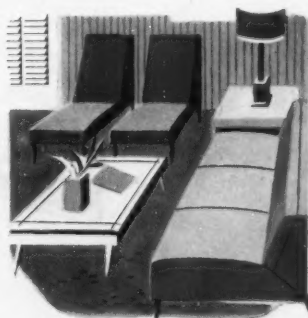
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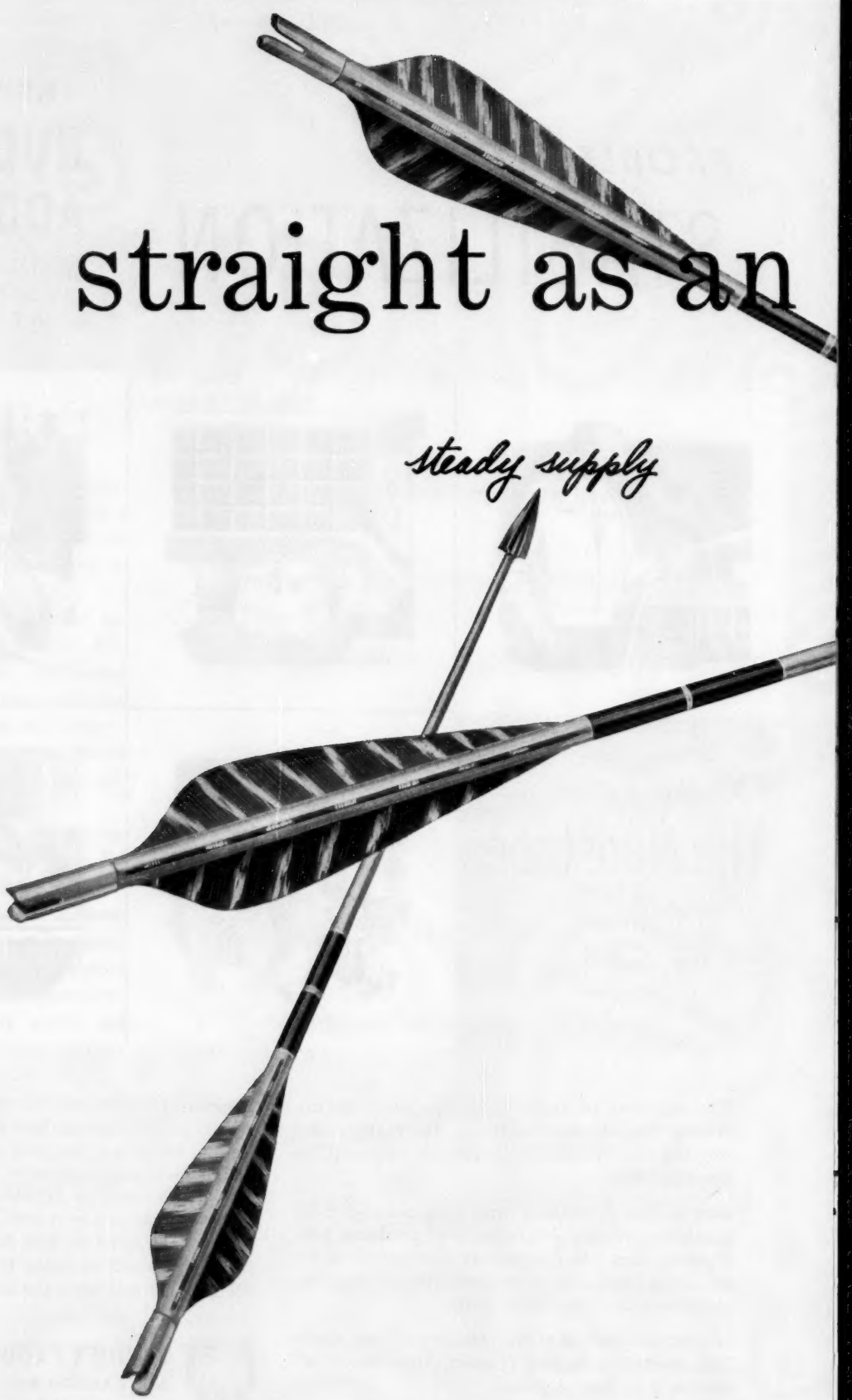
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SPECIALTIES



PERFORMANCE TEST: Low-cost polystyrene emulsions are the . . .

BLACK STAR

New Shine in Floor Polishes

If you're watching the growing use of synthetics in polishes, keep a close eye on polymer emulsions, particularly the modified polystyrenes. So far there is only one major producer of ready-to-use polystyrene emulsions for floor finishes—UBS Chemical Corp. (Cambridge, Mass.); but don't take that to mean that demand for these products is not growing.

Quite the opposite is pointed up by UBS's experience: in the past two years, sale of Ubatol have increased

more than 400%, and now represents the largest single segment of the firm's sales volume. Furthermore, Monsanto reportedly has been working on an entry for the field, but has not yet officially confirmed this or discussed its plans.

Monsanto tried selling polystyrene as an additive for polishes a few years ago without winning over a majority of polish makers. Its current approach has something new—a feature that has made Ubatol interesting

to wax people: very small particle size.

Most polymers have a particle size of 0.2 microns or over, whereas 0.1 is considered the maximum for good gloss in a polish (most dry-bright wax emulsions have particle sizes of 0.05-0.08). The new polystyrenes are under this: UBS's Ubatol U-2001 is claimed to have a particle size of 0.03-0.05, the newer U-2003, 0.01. This bolsters polystyrene's position as one of the several synthetics seeking to displace carnauba as a major ingredient of polishes. Ubatol now comprises as much as 70% of the solids content of some polishes.

Why Synthetics? With carnauba cost, quality and availability as unpredictable as a runaway dog, more and more edgy polish makers are eyeing the peace and quiet of the orderly world of synthetics. Their laboratories are kept busy manipulating combinations of polyethylene (*CW*, June 23, p. 49), Fischer-Tropsch waxes (*CW*, Aug. 25, p. 76), carnauba, candelilla, shellac, and oxidized microcrystalline waxes. The word to lab researchers is to come up with more routes to products with present performance standards rather than products with better performance.

Many floor finish makers look for the kind of flexibility that will allow them to compare five or six formulations on a cost basis every few months and switch into production of the one that comes out cheapest. Although the ideal from the cost and reliability standpoint would seem to be an all-synthetic formulation, few have so far come up with formulations not containing at least some carnauba. Exception: R. M. Hollingshead Corp.'s (Camden, N.J.) Floor Show.

Add to this the fact that some of the synthetics also seem expensive, particularly when familiar natural waxes are cheap. Among them is Ubatol, at 18.4¢/wet lb. (36% solids) in truckloads. Thus, it's easy to see why formulators in the competitive, cost-conscious polish industry can't settle down and live with any one formula.

What Does It Add? Since the final balance of qualities is the important thing, it is usually hard to say just what any one ingredient has added.

For example, although one formulator using Ubatol says the main reason why he adds it to his polishes is to

Vital protection for your products



A Report to Three Key Industries ON DOWICIDE PRESERVATIVES

New booklets for the ADHESIVE, PAINT and VARNISH, and PAPER and FIBRE BOARD industries give detailed product protection information

For you who are responsible for maintaining the quality of your firm's products, Dow has prepared these three information-packed booklets on the application of Dowicide® preservatives.

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odor problems in starch-based, protein-derived and synthetic adhesives. For paint and varnish—factors affecting mold development, desirable characteristics of a preservative, and adding preservatives to the product. For paper and fibre board—preservatives for manufacturing operations, methods of incorporating preservatives into pulp, paper, and fibre board products.

Dowicide preservatives play equally important roles in other fields of industry—building materials, floor coverings, textiles, leather, petroleum, cosmetics and waxes, to name a few. Many firms have found that Dowicide products pay their own way by increasing production efficiency and assuring product quality.

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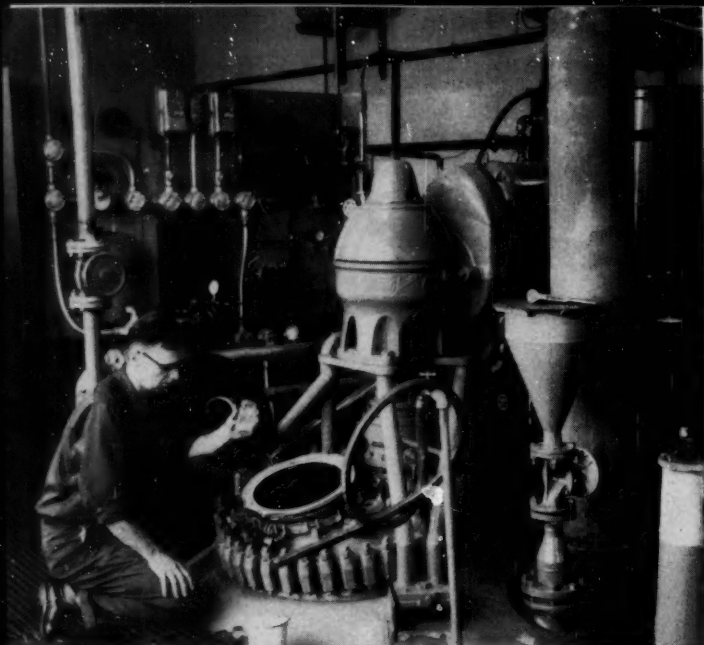
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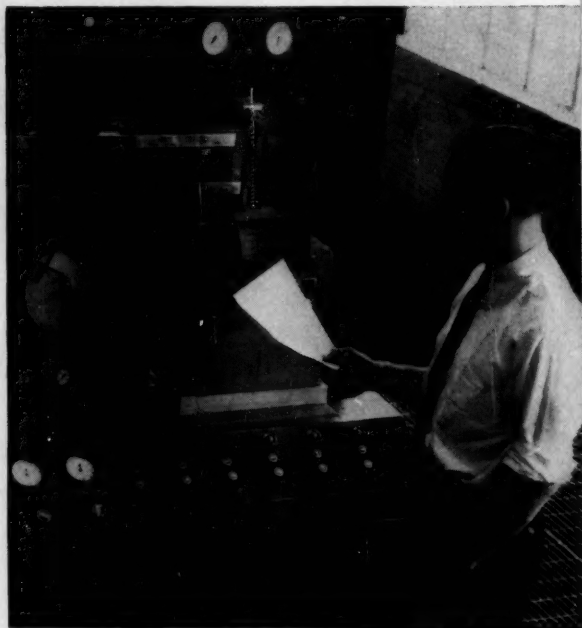
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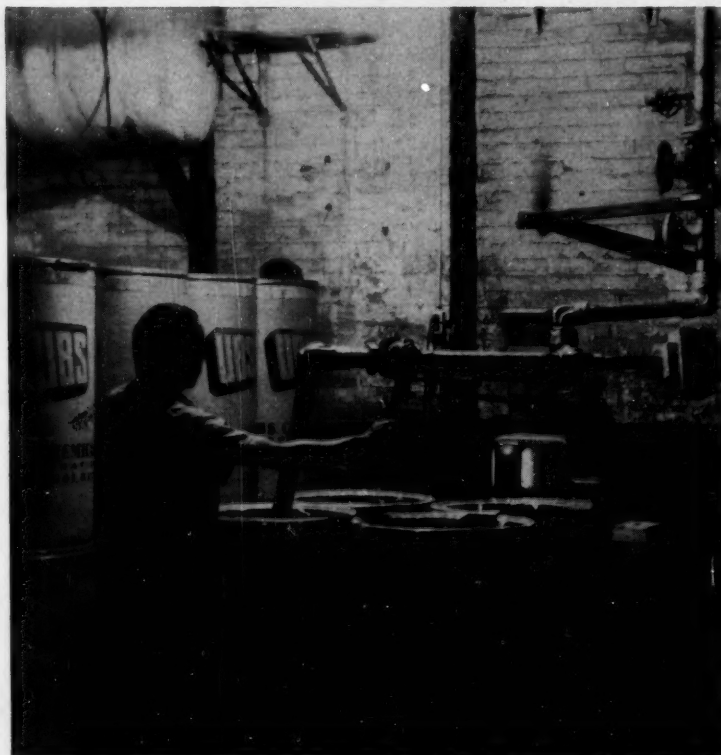


REACTION START: Styrene monomer's the raw material for Ubatol; UBS can turn out 8,000 gal./24 hours.

PROGRESS CHART: Lincoln Redshaw, in charge of manufacturing, checks record of reaction time and temperature.



Polystyrene for polishes is made automatically in a converted boiler factory



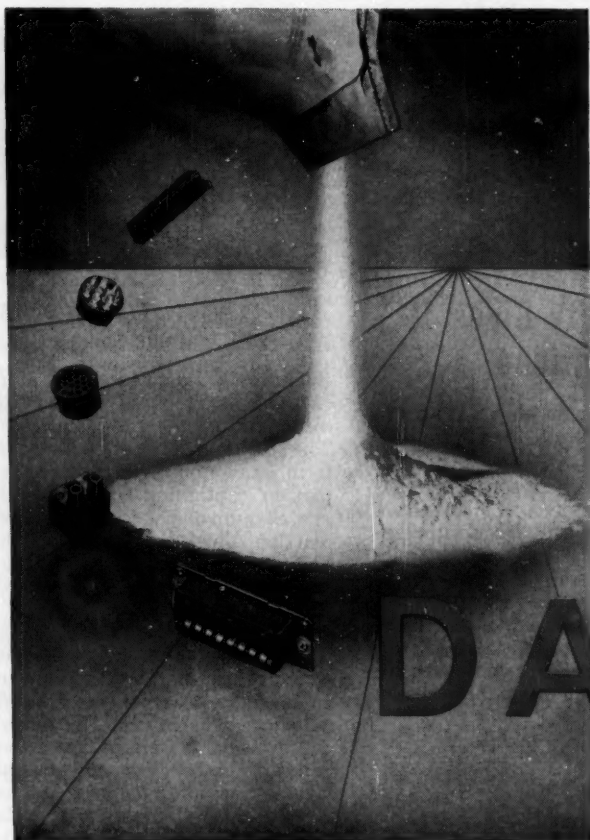
READY FOR SHIPMENT: Finished Ubatol, a freeze-thaw stable liquid with 36% solids, is packaged and shipped in fiber drums lined with polyethylene.

impart slip resistance, UBS doesn't claim any antislip properties for the ingredient. It does, on the other hand, claim:

- Good gloss from the small particle size.
- Toughness, imparted by a high molecular weight (over 150,000).
- Water resistance, since the emulsifying agent is not water-soluble.
- Removability, on the other hand, with use of soap solutions (permanently possible).
- Freeze-thaw stability.
- Good aging properties.

One of the most important advantages—without which the others would lose much value—is the fact that the polystyrene emulsion is compatible with most other floor wax ingredients, including carnauba, shellac and polyethylene.

Wax Mix: In carnauba formulations using Ubatol, the polymer ranges between 20 and 70% of the solids content, the carnauba being added so that the two together total about 90% (the other 10% is plasticizer, resins, shellac, etc.). The ratio picked depends on the type of performance desired: the more Ubatol, the tougher the fin-



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 - ▶ less shrinkage
 - ▶ easier handling

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Molding compounds, impregnated textiles, resin blends containing DAPON resin have important applications. Products such as *decorative laminates; molded parts* for service under high humidity or corrosive conditions; *low pressure laminates* for structural or high frequency work are now being made with DAPON resin. In these applications the absence of volatiles, low shrinkage, excellent physical and electrical properties make DAPON resin the ideal choice.

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The remarkable solvent power of methylene chloride is easily the most outstanding characteristic of this versatile hydrocarbon. Comparing favorably with the more common polar solvents, methylene chloride also offers the advantages of nonflammability and relatively low toxicity. These properties have been produced for methylene chloride a host of interesting applications in addition to its use in aerosols and paint removers. For instance in:

RESIN CASTING—The solvent power of methylene chloride is useful in the casting, in films or other desired shapes, of high-acetyl cellulose acetate from its solution in methylene chloride with alcohol and triphenyl phosphate or other suitable plasticizer.

CLEANING COMPOSITIONS—Methylene chloride may be mixed with a high-boiling, high-flash petroleum fluid to prepare a motor-cleaning mixture of relatively low flammability and toxicity, with a satisfactory rate of evaporation. This versatile solvent has also found its way into the metal-working industry as a vapor degreasing solvent for metals and metal parts when it is desired to clean at low temperatures.

HEAT TRANSFER—The physical and thermal characteristics are favorable for its use as the refrigerant in low-pressure systems using rotary compressors for air conditioning and for domestic refrigeration. Its low-freezing point and high specific

heat are valuable when it is used as a low-temperature brine or coolant.

EXTRACTION—The low boiling point and excellent solvent properties of methylene chloride have been applied in extraction operations, particularly where the extract is a heat-sensitive substance. It may also be used as a reaction medium or product extractant in the manufacture of fine chemicals, pharmaceutical intermediates, alkaloids, natural or synthetic waxes and resins.



CHEMICAL SYNTHESSES—Reacted with organosilanes, methylene chloride yields organosilicon polymers in which the silicon atoms are interconnected by methylene radicals. Similarly, methylene chloride is used to insert a methylene bridge between rings of certain heterocyclic compounds.

For complete information on the properties of methylene chloride mail the coupon below.

Prepare Alcohol-Free Alkoxides with Metallic Sodium

Sodium alkoxide solutions or slurries can be prepared by reacting sodium with an excess of alcohol. The sodium may be added in solid form, as molten metal, or in a dispersion containing sodium particles. Sodium dispersions reduce the reaction time considerably, even when mild agitation is used. Toluene and xylene are the preferred dispersion media for this use.

Alcohol-free alkoxides can be prepared by reacting stoichiometric amounts of alcohol and sodium in an inert hydrocarbon medium at refluxing temperature. For example, by using a sodium dispersion in xylene, both sodium and alcohol may be flowed into refluxing xylene to form the soluble simple alkoxide without formation of the alcohol-alkoxide complex.

For further information on this technique, or on other uses and techniques for using sodium dispersions, just check the handy coupon and return it to us.

Textile Finishing Gets an Assist from "Elvanol" Polyvinyl Alcohol

With today's lively interest in crease-resistant, wrinkle-resistant fabrics, finishing materials for these fabrics are becoming increasingly important. The properties of "Elvanol"—high tensile strength,



flexibility, good abrasion-resistance and adhesion together with water-solubility—clearly indicate its usefulness as a textile size. And, when used with the thermosetting resins that make wash-and-wear possible, it becomes a wash-fast size.

E. I. du Pont de Nemours & Co. (Inc.)
2526 Nemours Bldg., Wilmington, Del.

Please send me literature and information on: (CW-10)

- ☐ Methylene Chloride
- ☐ Sodium
- ☐ "Elvanol" Polyvinyl Alcohol
- ☐ "Albone" Hydrogen Peroxide



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"Elvanol" has been found to be an excellent modifier for textile finishes based on thermosetting resins such as urea-formaldehyde, melamine-formaldehyde and "Zeset" S fabric stabilizer for wrinkle-resistance developed by Du Pont.

These resins, used to impart crease- and wrinkle-resistance, require modification to improve the hand of the fabric. Incorporating "Elvanol" imparts firmness and resilience to the fabric. In addition, the "Elvanol" is fixed by chemical reaction with the thermosetting resin during the curing step.

Need more information? Just check the attached coupon.

"Albone" Hydrogen Peroxide—Key Chemical for Many Organic Reactions

When properly activated, "Albone" hydrogen peroxide is a highly effective oxidizing agent for organic syntheses producing a variety of interesting applications.



For example Epoxidation—the epoxidation reaction has greatly simplified the conversion of fatty oils and derivatives into useful and commercially profitable products.

These epoxides are useful as plasticizers, stabilizers, insecticides and drugs. In addition, they show good possibilities as lubricants, coating constituents and intermediates.

Or Hydroxylation—here "Albone" converts olefins into glycols. (In this reaction, epoxides and derivatives may be formed first.) Long-chain glycols have value as plasticizers and modifiers in coatings, rubber, plastics, etc.

Certain sulfur oxidation products using "Albone" have shown antimicrobial activity.

Fill in and send coupon for more information.

SPECIALTIES

ish; the more wax, the more buffable it is.

Much the same is true of polystyrene-polyethylene combinations, the most common variety of synthetic product. Polyethylene has durability, gloss, nonslip, emulsion stability, and toughness without brittleness. Furthermore, it is cheaper than either carnauba or Ubatol. But it is a fairly soft wax, and to make a harder polish, polystyrene is added.

Shellac producers who plunged into the polish market when they were knocked out of their lucrative phonograph record business by vinyl may find they have jumped from the frying pan into the fire. For shellac is one of the substances that polystyrene is threatening most.

Several efforts have been made to substitute the polymer for all or part of the shellac content of high-shellac polishes. For example, The Beacon Co. (Cambridge, Mass.), maker of a

high-shellac polish, is experimenting with polystyrene, is believed by some to be contemplating making its own polymer (as is S. C. Johnson and Son, Inc., Racine, Wis., maker of carnauba and shellac products with synthetic additives). Already, Simoniz Co. (Chicago) is replacing shellac with "cerro resin" additive called Simolite.

Formulation Tribulations: If polystyrene emulsions help to provide many roads to a given performance, they are for the most part harder roads. In the first place, unlike most materials used by polish makers, the polystyrene emulsion is delivered as a liquid in drums, which requires a different kind of material handling. The plant would need pipes and tanks and other equipment that could be put on a stand-by basis if the economics of ingredients put polystyrene temporarily out of the formulation. Apparently, this has not been

Team coordinates ideas and execution



ATWOOD (left), EARLE: President Atwood handles administration; former President Earle concentrates on product ideas.

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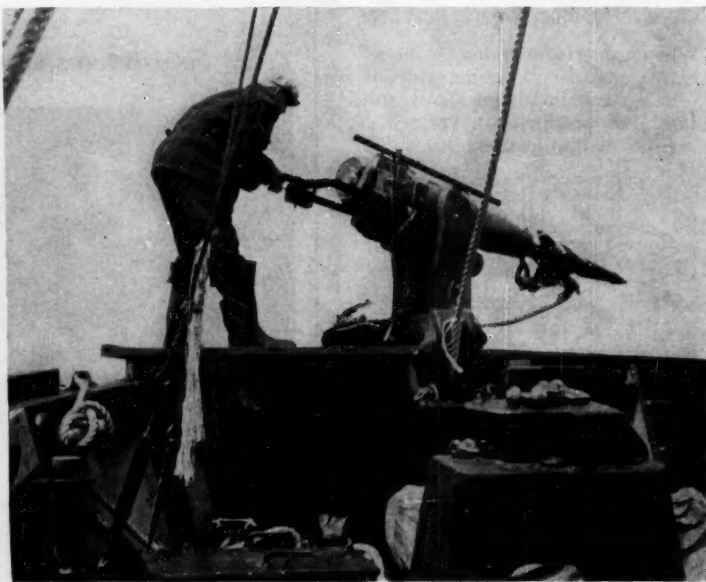
too big a problem, so far. UBS reports little fluctuation in demand for Ubatol, an indication that it has a fairly secure position in formulas where it has been adopted.

Allowance must also be made for the inclusion of a plasticizer—something not needed by most polish formulations. Without a plasticizer, the polystyrene would be too rigid. Typical of those used are tributyl phosphate and Ohio Apex's KP-140, which also act as levelers (resins will also be needed to further the leveling effect; Ubatol alone doesn't level well). But polish makers have handled tougher jobs.

Who Is UBS? Formerly known as Union Bay State Chemical Co. (before that, Union Blacking Co.), UBS now uses initials only. Its foundations are set in the Boston area shoe industry, for which it supplied (and still

supplies through a special division) finishes and adhesives. Wartime research and the direction of Roland D. Earle, idea man and president from 1938 until four years ago, broadened the base of the company's operations, putting it into the manufacture of Ubatol and an upholstery textile backing (to upgrade upholstery fabrics) called Unibac, as well as other new polymer products. When Earle began his present job as director of new product development (where he can concentrate on ideas), Paul W. Atwood was made president (where he can concentrate on administration).

The company expects to broaden the scope of its market in synthetics such as Ubatol. By tailor-making a variety of polymers, utilizing various monomers in combination with its special techniques, it sees a potential market that it hesitates to limit.



Whale-Size Antibiotic Syringe

THE HARPOON GUN, science's contribution to the hardy sea trade of whaling, now serves a new function: syringe to inject antibiotics into whales. Norwegian whaling companies have worked out the technique, which is used primarily to reduce losses of the killed animals due to spoilage, rather than to cure ills of the giant sea creatures. Still

under trial, the new system utilizes a preparation called Biostat, based on Pfizer's oxytetracycline (see p. 48). It can be introduced into the whale's body by the harpoon during the chase, or it can be shot into the whale's stomach after the kill. Both meat and oil are said to remain in good condition longer if the antibiotic is used.

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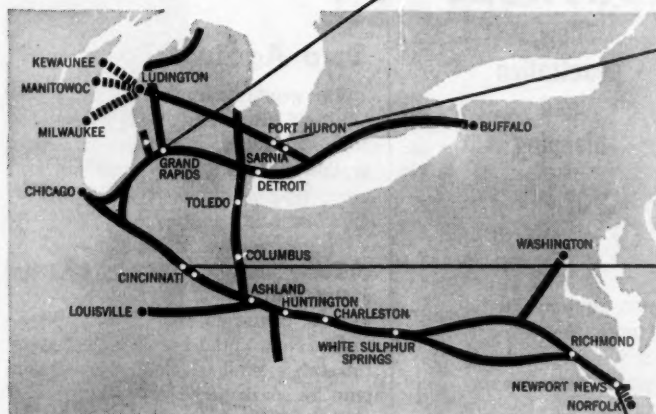
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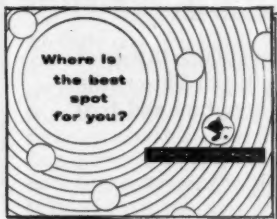
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CW-116

SPECIALTIES

First Raid, Now Glade

Glade is the name of a new household air freshener to be marketed by S. C. Johnson & Son, Inc. (Racine, Wis.). Companion household item to the firm's Raid insecticide bomb, the new product is offered in both aerosol form (at 89¢ retail) and wick style (69¢). Two scents are also offered. blossom and evergreen.

The new material, according to Johnson, is neither masking agent nor olfactory dulling agent, but actually neutralizes objectionable odors by chemical reaction.

Johnson, with a line of floor waxes that has made it one of the top names in home specialties, only recently began its diversification, when, early this year, it introduced aerosol Raid. In test-market cities, Glade has outstripped the early records of Raid.

Two Against Pain

The gentle approach, already proving itself effective in selling everything from cigarettes to household antiseptics, will be used to push still another type of product, linament for muscular aches and pains.

This week, Rexall Drug Co. (Los Angeles) lifts the curtain on its new external analgesic, Thru, in a coast-to-coast campaign, and VCA Laboratories (New York) has already slipped Intracel, a similarly touted analgesic, onto the market in Chicago.

Both are plugged as being soothing, without causing any of the reddening or blistering common to the "counter-irritant" types of analgesics. The ability to "penetrate through the skin and into the tissues to give direct relief" is stressed in typical ads; this property is due to a special lipophilic agent, according to Rexall blurbs.

Suggested for use on sunburn, sprains, strains, minor rheumatic pains, and the like, the new compounds are also said to be free of "hospital" odor. And for these benefits, the consumer pays a bit more than he's used to—Intracel is tagged at \$1.49 for 2-oz. bottle.

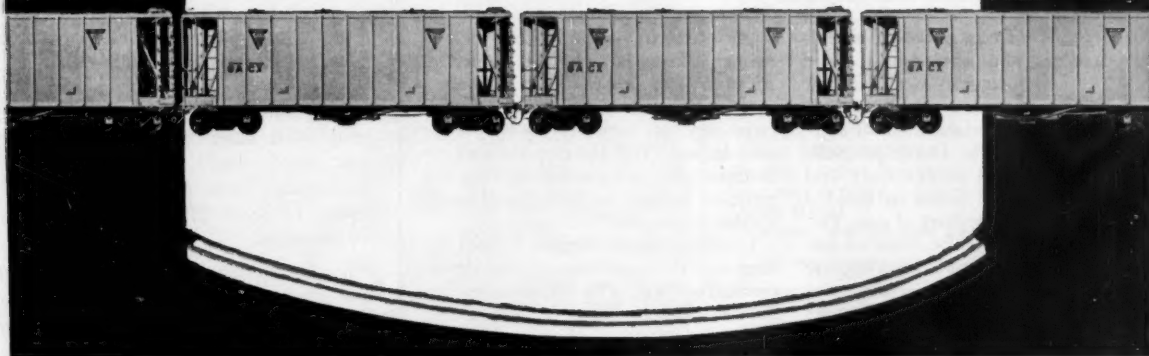
PRODUCTS

Show Pieces: Among the new products introduced at last week's Paint Show in Cincinnati—

• Primers for vinyl coating, by

Flour, starch, plastics, sugar—these are a few of the many products successfully shipped in General American's Airslide Car.

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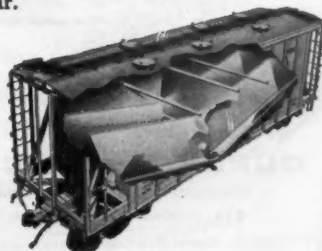
Savel Ship chemicals in bulk via Airslide® cars

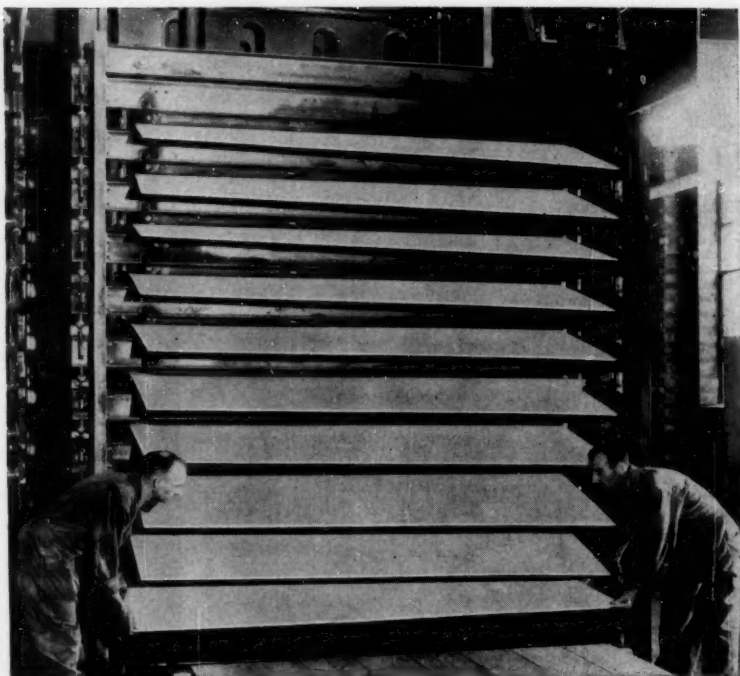
Airslide cars provide *safe, clean, economical* bulk transportation for dry, powdered chemicals. 35 tons of lighter materials (and even greater quantities of denser materials) can be shipped in a single Airslide car. Over 2000 Airslide cars are now in use or on order carrying chemicals and other commodities. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's new Airslide car.

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Chemical Resistance	Insoluble in acids, mild alkalis, and all organic solvents.
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Water Resistance	Impervious to hot and cold water...forming completely water-resistant glue lines.



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Export Agent: Omni Products Corp., 460 Fourth Avenue, New York 16, New York

HOOKER
CHEMICALS
PLASTICS

SPECIALTIES

Bakelite Co., division of Union Carbide and Carbon Corp. A new series, these products are said to improve the adherence of the coating: plastisol or organosol systems can be coated onto primed flat sheet, and the sheet formed or stamped without rupture of the finish. The products—Flexol XL-5497, 5498, 5507—are based on phenolic and vinyl chloride-acetate resins.

- Latex Resin WC-130, also by Bakelite. For the formulation of interior latex paints, it is said to permit pigment concentrations of up to 60% (30-40% is conventional), without appreciably lowering scrub-resistance.

- Arolon 110, a new water-emulsion vehicle for paintmaking, by Archer-Daniels-Midland Co. A vegetable-oil product, it is said to disperse chemically reacted drying oils in water to yield paints possessing "higher resistance to water than other water-emulsion paints." At the same time, it is claimed, these paints can be easily washed from roller or brush when wet. Both flat or semigloss finishes can be made with Arolon 110. ADM doesn't make finished paints itself, supplies only raw materials.

- Lytron 680, an interpolymer latex for interior and exterior paints, by Monsanto. This vehicle is said to feature high pigment binding, compatibility with other paint components, low odor, early water-resistance, washability, exterior durability, and ability to form films easily at low temperatures.

EXPANSION

More Lestoll: Ground has been broken for a new Adell Chemical Co. plant in the Holyoke Water Power Co. Industrial Park in Springdale, Mass. Adell will devote the new 37,500-sq.-ft. plant to production of its household detergent, Lestoll.

Photo Development: Charles Bruning Co., maker of copying machines and sensitized copying paper specialties, has broken ground for a \$3-million plant and office building in Mount Prospect, Ill., a Chicago suburb. The 307,100-sq.-ft. building will give twice the room of the present two Chicago plants, which will be sold. All operations will be moved around July 1, 1957. A 30-acre site allows room for expansion and a heliport.



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37% Copper as metallic. Available in poly-lined drums or bags.

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36% Zinc as metallic. For agriculture and industry.

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MANGANESE

MANGANESE SULFATE

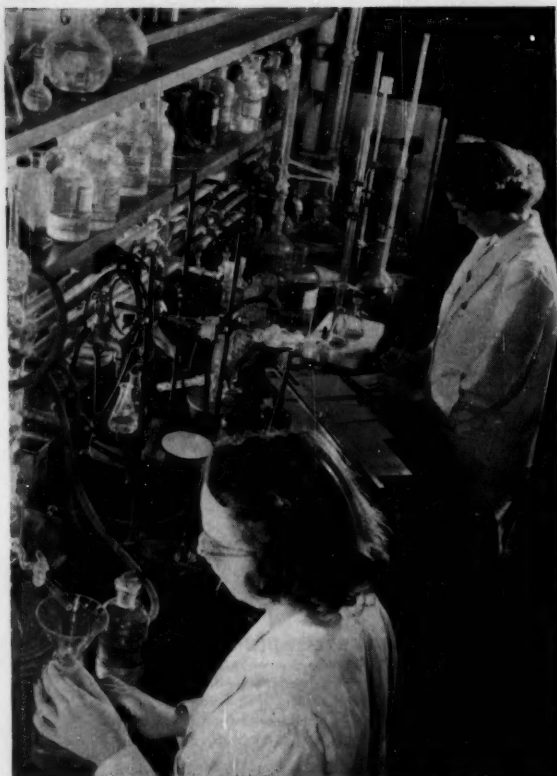
65% Mn SO₄. Designed specifically for inclusion in mixed fertilizer.

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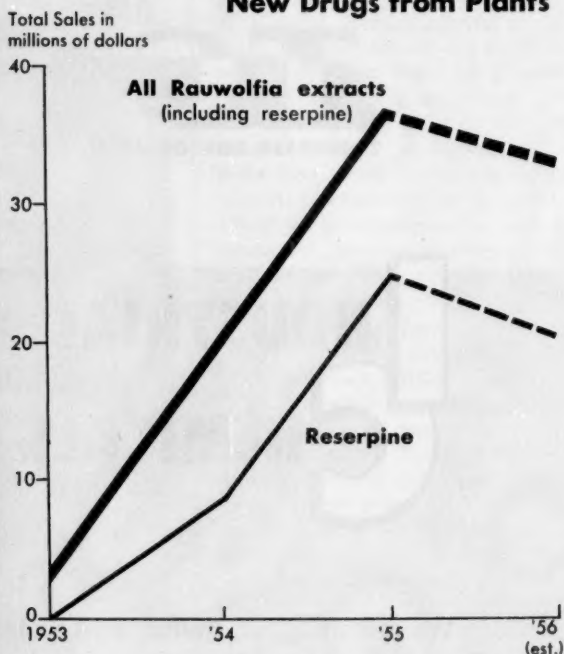
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Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.



RICH RESERPINE REWARDS...

Spark Research in New Drugs from Plants



Drug Research Heads Back to Nature

Maybe Grandmother had the right idea with some of her home remedies and maybe the tribal witch doctor with his mysterious herbs was on the right track after all. That, at least, is the opinion of a growing number of pharmaceutical research groups that are systematically examining the old "cures" in the hope of turning up potent new drugs.

There's always been a certain amount of interest in that kind of research. And lately, thanks largely to the success of reserpine,* it has been renewed.

A focal point of plant-drug studies is Michigan State University (East Lansing), where about 2,000 plant species have already been screened for antibacterial (mostly antituberculosis) and antifungal activity.

Headed by horticulture professor Eugene Lucas, the project is still grow-

ing—although it has existed for some time as a cooperative venture of the university's botanical, chemical, microbiological and pharmacological departments. So far, Lucas's work has been government-supported by about \$100,000 in grants from Public Health Service (National Institutes of Health). But Lucas is expecting commercial assistance.

A number of drug companies are involved in the field. G. D. Searle (Chicago) is combing a list of Mexican plants in its research program. Abbott Laboratories (North Chicago, Ill.) points out that digitalis and most plant drugs originated in folklore, confidently expects new agents to emerge from studies of reports by foreign doctors, historical diaries, etc. Eli Lilly, although it doesn't stress that approach in its studies, does collect plants from all over the world. Its phytochemistry department does most of the investigations, so far has completed only gen-

eral activity tests. Miles Laboratories, which concentrates on screening synthetic organics, does test some botanicals. It found a few interesting plant antibiotics, but gave them up as potentially uneconomical.

Not too long ago, Florence Fitzpatrick—department of virology, Sharp & Dohme Division (West Point, Pa.), of Merck & Co.—reported† on extensive screening of plant extracts for activity against *Mycobacterium Tuberculosis*.

Dr. Fitzpatrick says: "The successful treatment of such infectious diseases as malaria, amebiasis and leprosy for many years with specifics of plant origin makes a continued search for a tuberculostatic agent in the plant kingdom worthwhile."

Included in the tests were extracts of about 300 vegetables, fruits, herbs, trees, wild and cultivated plants. She

*One active ingredient is *Rauwolfia* root, used therapeutically in India for centuries.

†Antibiotics & Chemotherapy, Vol. LV, No. 5, May 1954, p. 528.



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RESEARCH

selected plants that appear naturally healthy and free of disease with the idea that "they might conceivably contain antibacterial agents." Availability was a factor in choosing plants for study; "scarce or exotic varieties" (with a few exceptions) were excluded.

About 23% of the extracts tested, most of which were extracts of leaves, inhibited growth of the microorganism. But when tannins were removed from active extracts containing them, the number of active extracts dropped by about two-thirds.

Recently, L. Ferenczy of the University of Szeged, Hungary, tested seeds not more than a year old (from 400 plant varieties and species of 70 plant families) against such test or-

ganisms as *Bacillus subtilis* and *Staphylococcus aureus*. Found: one potentially useful antibiotic, isolated from a common garden plant.

Plants and Ulcers: Cutter Laboratories (Berkeley, Calif.) is participating in a project that in some respects is similar to the work done by Lucas at Michigan. It's now contributing financially to studies at the school of tropical and preventive medicine of the College of Medical Evangelists in Loma Linda, Calif. Current work includes search for an antiulcer factor in cabbage and olives, and examination of plant remedies used in remote geographical areas. Under a recently signed NIH contract, the college will also survey domestic and foreign plants for anticarcinogenic compo-

nents, test about 20 plants a week for the next two years.

Jointly supported by government agencies and Cutter (which has no hand in actual direction of the program), the school's medicinal search grew out of early work in biotoxicology by its associate dean, Bruce Halstead. Halstead, who now has overall charge of the project, can tap into a unique and abundant source of exotic plants. That's because the college (founded by Seventh Day Adventists) can enlist the services of missionaries in 180 stations scattered throughout the world—many in remote regions. The missionaries are urged to send samples of native remedies, work with plant-seeking expeditions. The latter are supplied with information on po-



THERE'S MORE to research on botanical drugs than isolating potentially valuable compounds: the plants themselves may need study to determine optimum growing conditions for best yields. This tropical outpost of the U.S. Dept. of Agriculture—the Federal Experiment Station in Puerto Rico—is a site of such research. A top project: selective growth of the tropical yam *Dioscorea*, a source of cortisone-precursor sapogenin.



The yam normally grows wild in rain forests of Puerto Rico and Mexico and isn't easy to collect. Horticulturist William Kennard (right) and Thomas Theis, assistant in charge of the station, are seeking methods of domestic cultivation of bean-stalk-shaped *Dioscorea* and its tuberous root.


Successful outcome of their work could lead to cheaper cortisone.

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EPG-4



MICHIGAN STATE'S LUCAS: After 2,000 tries, a fresh start.

tentially valuable flora, given board, room, and local transportation.

Two expeditions, sponsored by the college, have just returned—one from Colombia, the other from Tanganyika—with 400 plant specimens. The African expedition included Saleem Farag, first member of the college's new anthropology department. Reports Farag: "Now is the time to intensify the hunt for native remedies. When the present older generation is gone, most of their plant drug lore will pass with them. The younger generation is influenced by Western ideas, scornful of old remedies. They want pills and injections . . . especially injections."

STPM expeditions bring back a specimen of any plant, root or herb the natives consider valuable, even if there's only a slim chance that it may have therapeutic activity. Farag's expedition brought back 80 specimens used for such things as relieving fever, easing sore throat, general antiseptic for wounds, curing insanity, hastening child birth, increasing lactation.

Most intriguing item: the possible insanity cure. For some reason, the part of Tanganyika visited by Farag and his colleagues contains a higher than ordinary number of schizophrenics. There's evidence that the cure—a boiled solution of the still-unclassified plant—helps some sufferers. The expedition saw no cures, but talked with

many natives who claimed to have witnessed cures or to have been helped themselves. (A missionary doctor attested to this evidence.) Samples of the plant were hard to get. Its secret, passed down from father to son, is an important source of livelihood* to some natives.

Right now, all 400 Tanganyika plant specimens are undergoing an identification procedure—always the first step in the STPM project. Later, chemists will make extractions, turn the latter over to pharmacologists to test for specific kinds of therapeutic activity. Promising extractions are returned to chemists who fractionate them to find the active principal.

None of the school's plant studies have turned up a marketable product as yet. Prospects include the seed of the Piptadenia plant (from Colombia) as an alkaloid source; olive pulp as an agent against ulcers and tuberculosis.

Despite all the efforts, the pickings have been pretty slim, so far. Researchers, however, find lots of encouragement from history. They remember the Greeks and Romans used plants containing salicylic acid derivatives centuries ago, that French peasants reportedly used mouldy bread as a poultice for wounds. They have high hopes of finding another aspirin or another penicillin.

*A cure is usually worth a cow to the practitioner.

EXPANSION

- United States Rubber Co.'s new \$4-million research center at Peapack, N.J., is expected to be dedicated in the fall of '57. To house a staff of about 400 researchers, it will be the company's headquarters for research in the fields of rubber, plastics, textiles and chemicals.

- Durkee Famous Foods, division of Glidden Co., has opened its new Chicago research center devoted to studies of fats, oils, related products.

- Electro Metallurgical Co. (Niagara Falls, N.Y.), a division of Union Carbide and Carbon Corp., recently moved into its new vacuum technology building. Research on utilizing the vacuum furnace in the metals industry will be stressed.

- Another division of Union Carbide and Carbon Corp., Carbide and Carbon Chemicals Co., this fall will start construction of a new multimillion-dollar laboratory at South Charleston, W. Va.

- The Quaker Oats Co. has opened its new chemical and food research laboratory at Barrington, Ill.

- The University of Maine (Orono, Me.) has started construction of a \$489,000 addition to its pulp and paper technology facilities.

PRODUCTS

Tagged Compounds: Thirty-eight carbon-14 compounds in 50-microcurie package-size are now available from Volk Radiochemical Co. (Chicago). Under new Atomic Energy Commission licensing procedures, such quantities of material can now be obtained without a formal license. Package prices start at \$12 for sodium carbonate, bicarbonate and acetate-1-C-14.

- Nitrogen-15 isotopes enriched to above 95% are available from Isomet Corp. (Palisades Park, N.J.). Compounds labeled with nitrogen-15 being offered: nitric acid, ammonium nitrate (labeled on either nitrogen atom), potassium nitrate, ammonium chloride, nitrogen gas and potassium phthalimide.

- **New Nucleosides:** Chemical Procurement Co. (New York) has a new series of 5, 6-dihydro-nucleosides. Included in the group: dihydro-3-methylthymidine, dihydro-3-methyldeoxyuridine, dihydro-3-methyluridine, dihydro-

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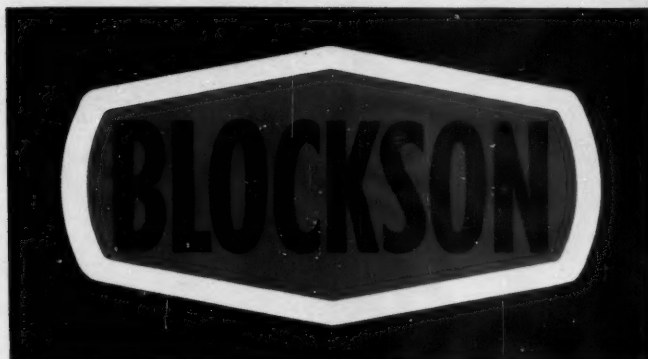
**Trisodium
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RESEARCH

drothymidine, and dihydrouridine. The newcomers reportedly show no impurities when checked by chromatography and elemental analysis, and no absorption in the ultraviolet range.

Silicone Intermediates: Union Carbide and Carbon Corp.'s Silicones Division (New York) is offering a new line of silicone chemical intermediates that are expected to have a wide variety of uses in the organic chemicals industry. Called OrganoFunctional Silanes, the newcomers reportedly react directly with organic chemicals. (Until now, silicones have been noted for their inertness.) Keys to the reactivity of the new chemicals are functional groups. Available: γ -aminopropyltriethoxysilane, δ -aminobutylmethyldiethoxysilane, β -carbethoxyethyltriethoxysilane, β -carbethoxyethylmethyldiethoxysilane.

APPARATUS

Sulfur Titrators: For analyzing sulfur in steel, iron, oil, slag, ores, etc., by the combustion-titration method, Laboratory Equipment Corp. (St. Joseph, Mich.) is offering three new sulfur titrators: a completely automatic model in which titration is continuously monitored by an electronic circuit; a semiautomatic model in which the operator titrates to a meter reading; and a basic model in which the color in the titration vessel is measured by eye.

No-Leak Gas Analyzer: Fisher Scientific Co. (Pittsburgh) is out with a new improved Fisher-Milligan Bottle that's said to guarantee leakproof operation. It features a two-part screw cap, has a hard-to-tip base (a safety feature when using corrosive absorbents). Application: to purify gases for analytical work, other laboratory jobs.

LITERATURE

• Battelle Institute's (Columbus, O.) Cobalt Information Center is out with a new 100-page reference bibliography, "Cobalt and Its Alloys, a Summary on Allotropy and Phase Diagrams." The work contains several hundred references to cobalt literature, includes phase diagrams of numerous binary alloy systems. Also available: "Corrosion Bibliography on Cobalt and Cobalt Alloys."

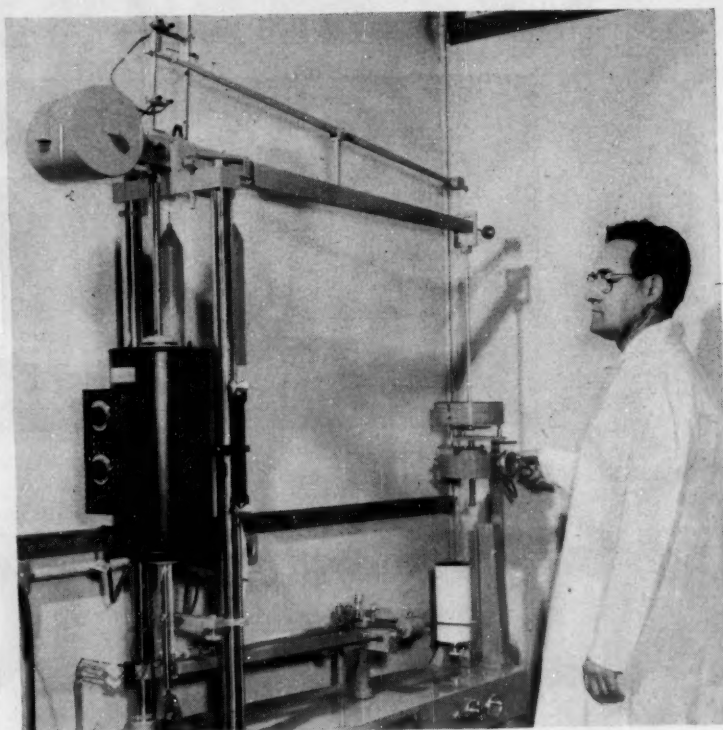
• "Thermal Conductivity Analyzers" is Arnold O. Beckman's (South Pasadena, Calif.) new 16-page booklet that provides information on the practical application and operation of continuous gas analysis instruments.

• The National Bureau of Standards is out with a new bibliography on Nitrogen 15. The references (which are not definitive) cover the period 1919 to '52, inclusive; some later references are also included. It's available from the U.S. Government Printing Office, Washington, D.C. Price: 15¢.

• Just published by Industrial Research Institute (New York) are the

proceedings of the April '56 symposium, "Research Is People." Topics covered by the group of research leaders included discussions on recruiting, motivation, recognition, rating and evaluation of research personnel.

• A new 4-page folder listing engineering and application information on Norelco EM-100B and EM-75 electron microscopes is available from the instruments division of North American Philips Co. (Mount Vernon, N.Y.). Forty-four typical uses for electron microscopes are tabulated along with operating data for the two instruments.



Metals for Hot Chemicals

TO HELP with its research into better metals for high-temperature chemical equipment, Shell Development Co.'s engineering and corrosion laboratory (Emeryville, Calif.) recently bought this novel "creep" tester. It's claimed to be the only one of its kind in the U.S., points up the forays chemical processing companies are making into other-than-chemical fields of research. The

Chevenard (named after its inventor) creep and relaxation tester is designed to examine resistance of metals to creep—the continuous flow of a solid under high temperature and heavy load. The device helps determine such essential data as life span of steel pipe and the limits of temperature and strain a metal can withstand. The operator is laboratory assistant G. M. Long.



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Though Nevillac Hard is not specifically an anti-skinning agent, as part of the resin component of your oleoresinous varnishes, it will minimize skinning and gelling. Thus, with Nevillac Hard you can use and have the good properties imparted by phenolics, maleics, styrenated alkyds, phenol modified alkyds or heat reactive resins *without a skinning problem*. Moreover, the presence of Nevillac Hard will give your varnishes intensified adhesion, improved clarity and lower acid values—all with no effect on the water and

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Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash, Wire Enamel Thinners, Nevsolv.

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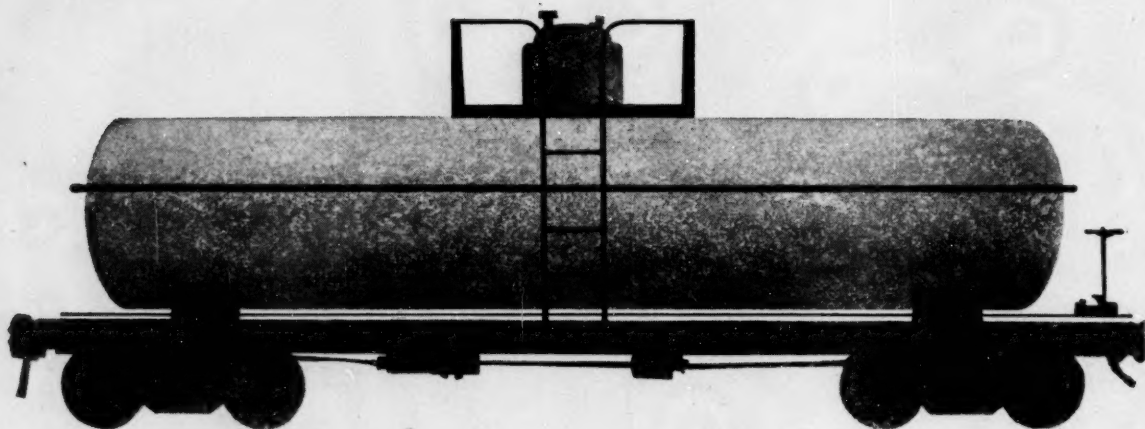
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Technology Newsletter

CHEMICAL WEEK
November 3, 1956

The free-piston engine will get a tryout in a chemical process plant in England. Imperial Chemical Industries will put in fifteen 1,000-h.p. Pescara free-piston engines developed by the Free Piston Engine Co. The latter company was formed earlier this year by Associated British Engineering; the engine has been several years in development.

ICI's Billingham Division will install the engines to drive several large rotary compressors in a new plant.

Watch for word soon that Freeport Sulphur is going ahead with a big plant to extract nickel and cobalt from its extensive ore deposits in Moa Bay, Cuba. The firm has long been eager to build such a plant, has operated a pilot plant for several months in Louisiana.

Under present plans, the company would mine the ore in open pits, leach it with sulfuric acid and then ship it to the U.S., where it would use the Chemical Construction process to reduce and separate the metals.

In *Engineering and Mining Journal* (October) Freeport President Langbourne Williams talks encouragingly about the progress made in the piloting venture. He's optimistic about a big plant. And the truth is that the project is much closer to realization than even his tone indicates.

Sign of the times: Carbide and Carbon revealed this week that it spent \$2 million more on air pollution equipment for its new Torrance, Calif., ethylene-chemical plant than would normally be necessary for such a plant.

Incidentally, the plant is now at full capacity, and that ranks Carbide as producer of about half the total U. S. polyethylene output. Moreover, its present research activity indicates that it's going all-out to maintain that lead. One of the intriguing developments the company is working on is a method of extruding a sheet of polyethylene and passing the still-hot material through forming equipment in much the same manner that metal is fed into stamping machines.

Now it's official that the government is interested in chemically powered bombers (*CW Technology Newsletter*, April 7). Contracts for them have been let, presumably to Boeing and North American Aviation. The planes would fly at 75,000 ft., at speeds three or four times as fast as sound.

Makers of organic phosphate insecticides are getting together this week at Hazelton Laboratories (Falls Church, Va.) to explore needs

Technology Newsletter

(Continued)

in fundamental phosphate insecticide research—how the compounds work, what they do in the body, what contribution industry can make.

The meeting was called as a result of the recent decision by the Food & Drug Administration to tighten the safety controls on organic phosphate insecticides (*CW*, Oct. 27, p. 25).

Watch for J. T. Baker to break out into some new fields of endeavor. At the dedication of its new laboratories in Phillipsburg, N. J., last week, Baker made it clear it would put 40% of its research effort into new products—pharmaceuticals, specialty plastics, certain metals. (The other 60% would be divided about equally between improving its present line and doing work for other members of the Vick family.)

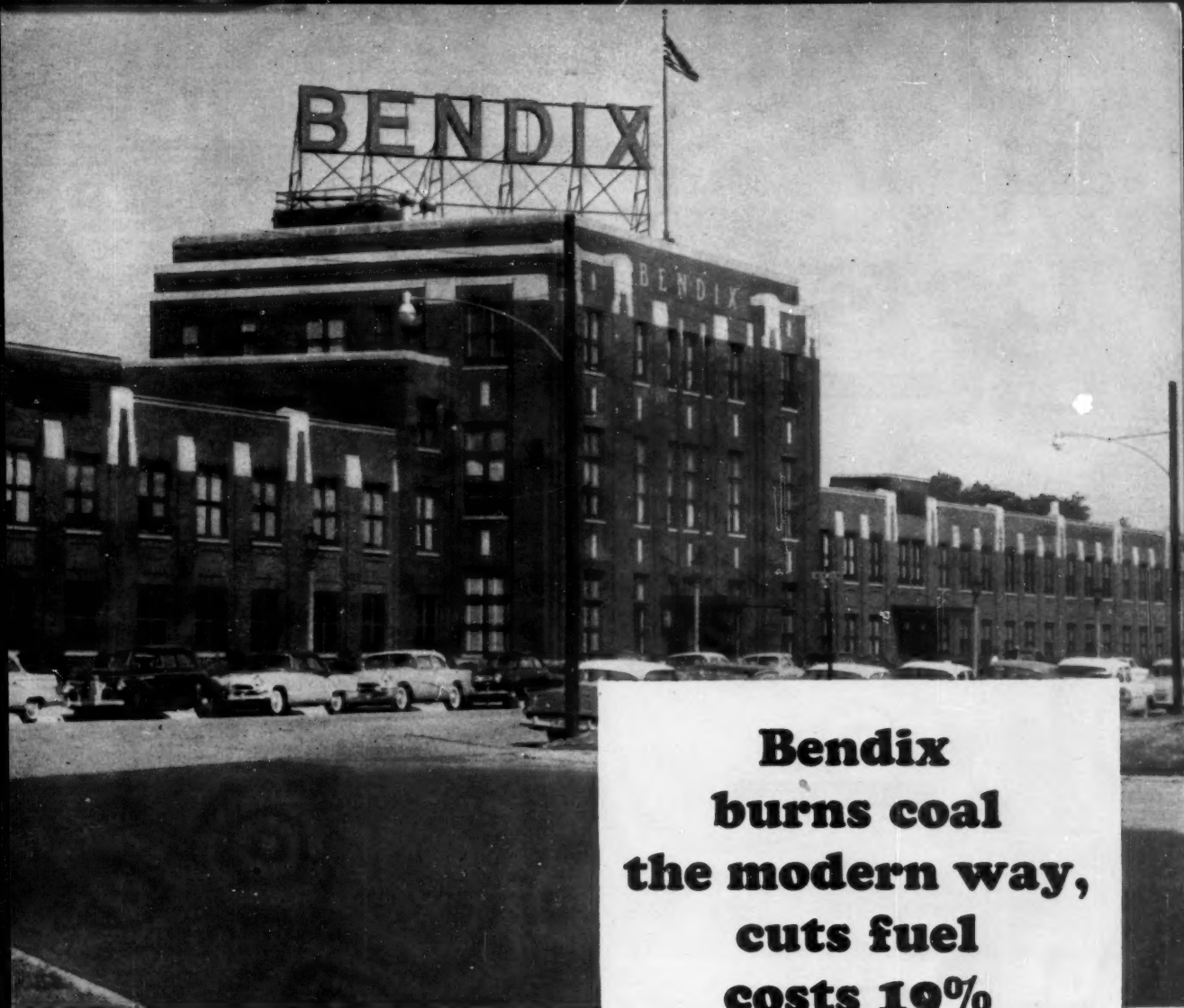
One of the first fruits of this effort is a new clear plastic related to the acrylics. The product is now in pilot-plant production and has not yet been priced. The firm is not ready to say much about the product, but presumably it's a copolymer. It is willing to say that the plastic and related compounds are expected to eventually be big money-makers.

The new thermosetting baking enamel brought out this week by Pittsburgh Plate Glass is also an acrylic. Tagged Duracron, it's said to perform more like porcelain than an organic finish. The company is now investigating other uses for the resin.

PPG won't say how it manages to make a thermosetting resin of normally thermoplastic-resin-forming acrylic monomers. Among potential competition: Du Pont reports it has done work on thermosetting acrylic enamels but is not now making any; Rohm & Haas is keeping its own counsel.

An experimental solar still to make fresh water from the sea may be built at San Diego, Calif. The city council has approved the use of a 4.8-acre site at Ocean Beach, south of the Mission Bay entrance channel. And a bill was introduced in Congress this year authorizing San Diego as the site for such a plant. A lease will now be drafted and sent to Washington for inspection; then it goes back to the city council for final approval. If all goes through, the plant will be in and operating in three months.

Northwest Nitro Chemical's new ammonium sulfate-ammonium phosphate plant in Medicine Hat, Alberta, is due to start up next week. It will be the first plant in North America to use St. Gobain's ammonium phosphate process. Big advantage of the process: it uses only one digester to make the phosphoric acid, whereas some other processes use as many as 11.



Bendix burns coal the modern way, cuts fuel costs 19%

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Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

At its Products Division, South Bend, Ind., Bendix Aviation Corporation undertook extensive modernization of its power system. The firm replaced two 511 HP boilers with two 80,000 lb./hr. spreader stoker fired units. A 500-ton overhead bunker and coal elevator-conveyor system were installed. Additional changes were made including an increase in the capacities of the water and air systems.

Today fuel costs at Bendix have been cut 19%, efficiency boosted from 70% to 82%, maintenance costs lowered 80% and availability upped from 50% to 96%. By burning coal the modern way, Bendix is saving many thousands of dollars yearly and will amortize the cost of modernization in a comparatively short time.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

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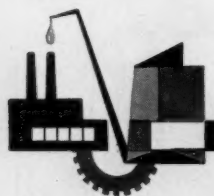
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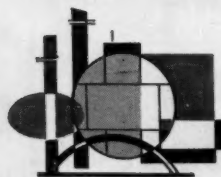
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1956 (est.)	1966 (est.)
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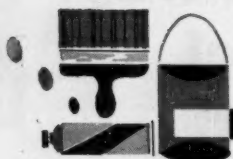
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(from 1 oz. to several pounds of sodium molybdate anhydrous per acre), the cost of treatment is practically negligible compared with usual fertilization costs.

When moly salts are applied with other fertilizers, labor cost is reduced. Further, pasture land treatment is necessary only once every few years. In contrast with the small costs, the cash benefits of treatment are large. This has been demonstrated in Australia where moly salts were among important nutrients correcting infertile scrub lands into lush pastures.

U.S. Output Push: Today, U.S. farmers alone use about 35,000 lbs./year of contained molybdenum. But as more areas are found to need this element—over 500,000 acres in Washington were discovered lacking in the required amounts, and many other suspected areas are under investigation—this consumption is expected to jump to over 2 million lbs./year by 1966.

Here's the projected U.S. step-up:

1956	35,000 lbs.
1957	60,000 lbs.
1961	1,250,000 lbs.
1966	2,000,000 lbs.

(Foreign agricultural use of contained molybdenum is also expected to grow impressively. At the moment, consumption is running at a rate of about 135,000 lbs./year; it's estimated that within five years, consumption will hit 1.3 million lbs.).

Bigger Oil Outlets: Use of molybdenum disulfide as an additive to supplement lubricating properties of oils and greases presents another promising and challenging market for the industry. The disulfide, with its laminar molecular structure, enhances and prolongs the lubricity of conventional greases and oils. This is especially true where temperature and atmospheric conditions are extreme and where prolonged greasing is desirable. Several major oil companies are testing moly sulfide-added lubricants. Trucking firms, bus fleets and railway lines that are using these upgraded products report good results.

Considering that it takes 3-15% by weight of the disulfide to obtain the desired effect in lubricants, and that in '56 alone more than 1.8 billion gal. of lubricating oils and greases will be sold, the potential market for the

Surge for Moly Chemicals

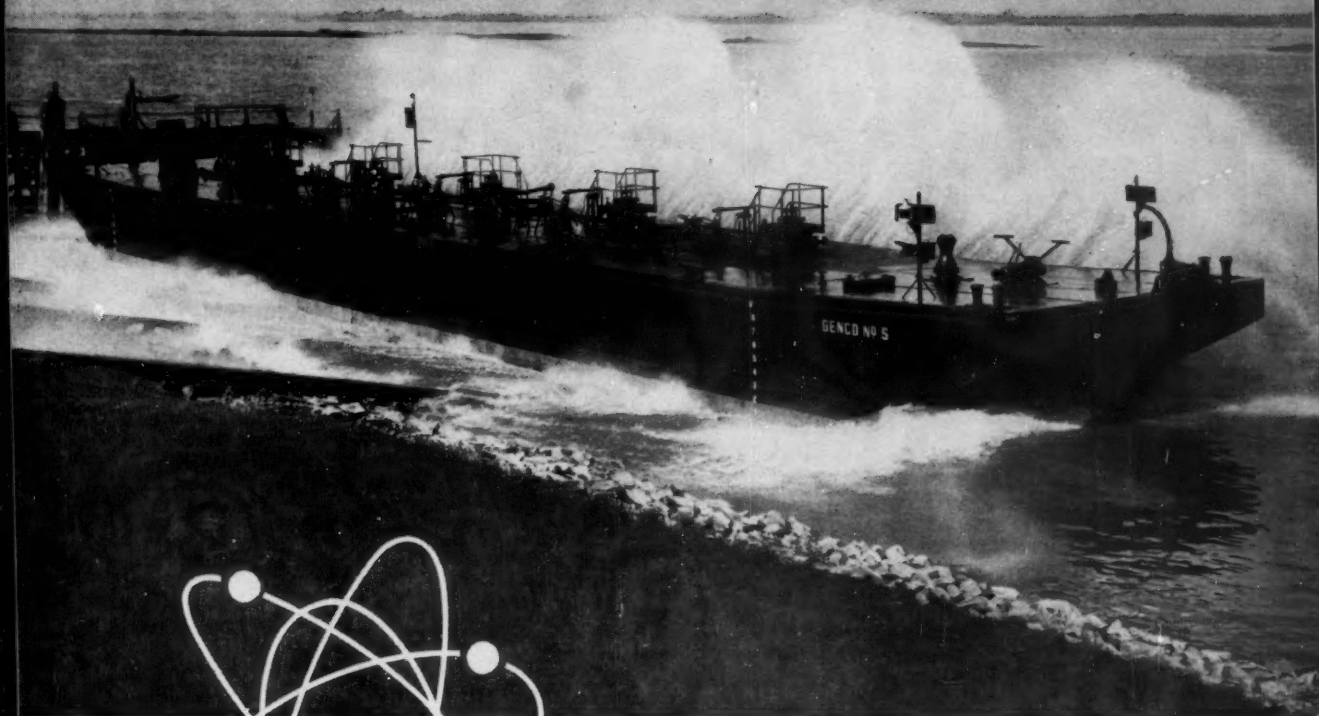
This year, U.S. consumption of molybdenum chemicals will hit an all-time high of 2.8 million lbs. But by '66, annual use is expected to soar to nearly 12 million lbs. Reason for the healthy hike: agriculture, lubrication, pigments, and catalytic processes will become broader outlets for a number of such molybdenum derivatives.

Producers agree for the most part that the potentialities of molybdenum chemicals will tie in most closely with agriculture. Molybdenum has become a commercially important micronutrient since scientists became aware of plant need for "trace elements." Molybdenum is the most re-

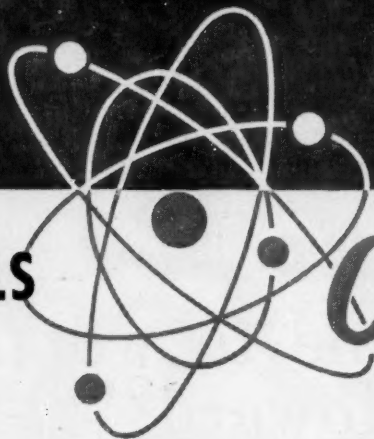
cent of the micronutrients proved essential to nitrogen metabolism. After intensive investigation, molybdenum deficiency has been identified in more than 40 crop plants. Legumes and citrus crops (nearly 40% of Florida's citrus orchards are considered below par in moly requirements) are most affected under field conditions.

Overseas Market Spark: Largest known areas of deficient soils are in Australia and New Zealand, where the value of moly fertilization was first demonstrated. Today these areas are the largest buyers of molybdenum for agricultural needs. Since the quantity of molybdenum salts required to correct a soil deficiency is very small

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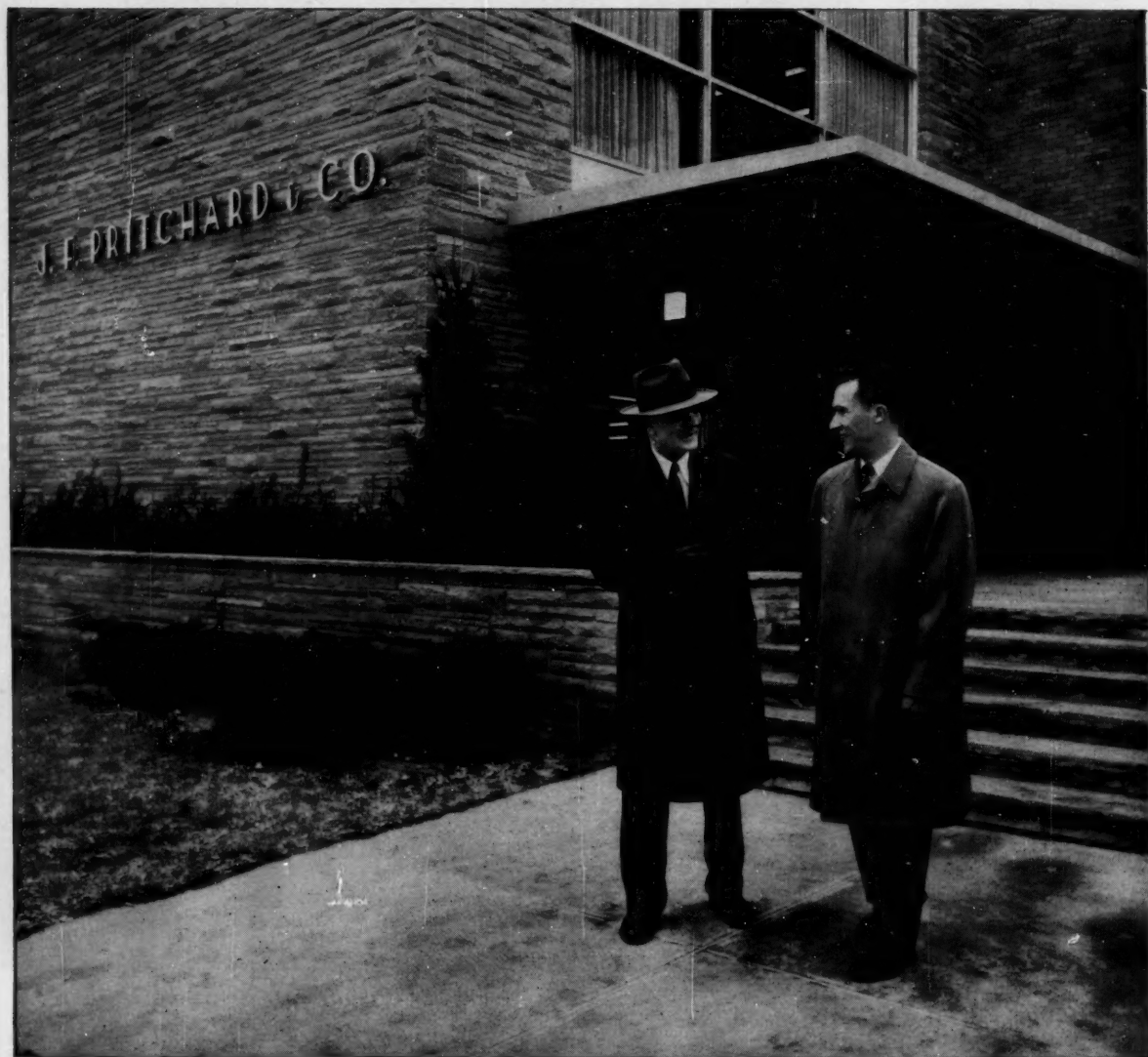
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“I’m more pleased than ever—if that’s possible. You know what happened today, up in the chemical division?”

“What?”

“We wrapped up the plans for a dry ice plant. It’s going to be a beauty when we get it built. I’ve never seen such teamwork before.”

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“That’s the way it has to be, Howard. We learned that philosophy many years ago. Experience and knowledge are only as good as the cooperation that goes into putting them together.”

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MARKETS

molybdenum derivative is tremendous. During this year, U.S. consumption of total contained molybdenum in lubricants will check out at about 300,000 lbs.; in 10 years, marketers anticipate a near 4 million lbs. That's a 14-fold consumption growth—the biggest expected market jump for all moly chemicals.

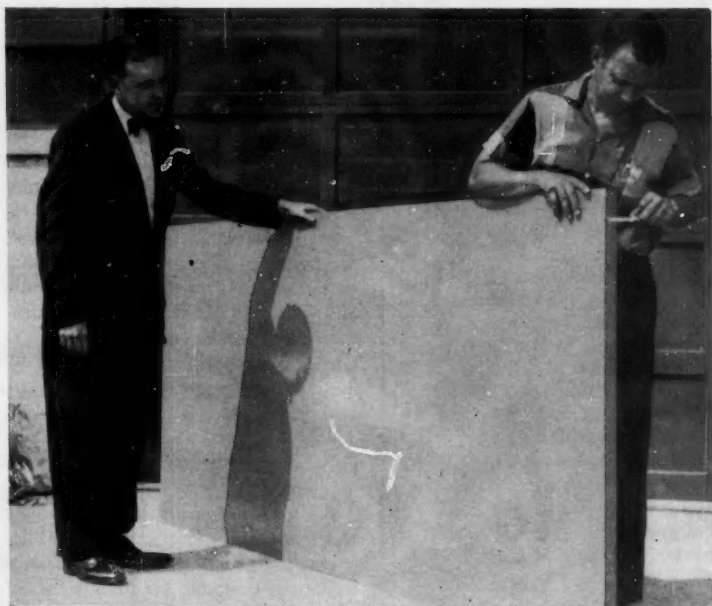
Significant growth is also expected in the use of molybdenum chemicals as additives in such solids as plastics (especially nylon), rubber and various friction materials (brake linings, facings, clutches). Incorporation of varying amounts of moly disulfide in these materials increases their wear resistance, lowers surface friction, steps up antiseize and release properties. Added advantages: improved dimensional stability and decreased thermal flow.

Friction materials have thus far taken more moly disulfide than have the plastic and rubber industries. Chances are, though, that the latter will

hop on the fast-moving molybdenum derivative bandwagon, and soon. With an average 15% by weight of moly disulfide needed to attain the best results in most solid uses, the market for moly may grow to some 400,000 lbs./year by 1966—26 times more than today's consumption.

Painting the Future: This year, the pigment industry will consume 750,000 lbs. of contained molybdenum, making it the largest current U.S. outlet for moly chemicals. But by 1966, even with a 1.8-million-lbs. consumption predicted, pigment use of moly should fall to third place in the line-up of outlets, trailing lubricants and the agricultural field.

Most important of all inorganic moly-containing pigments is molybdenum orange, widely used in paints, printing inks, plastics and leather. Competition between moly orange and chrome orange (*CW*, April 23, '55, p. 86) is still sharp. Molybdenum orange is



From PVC: Shatterproof Windows

WINDOWS of polyvinyl chloride—including this supersize 500-lb., 2-in.-gauge sheet—may open vast new markets for the plastic.

Tradenamed Seilon and offered to architects and builders by Seiberling Rubber, the sheet measures 4x8 ft.,

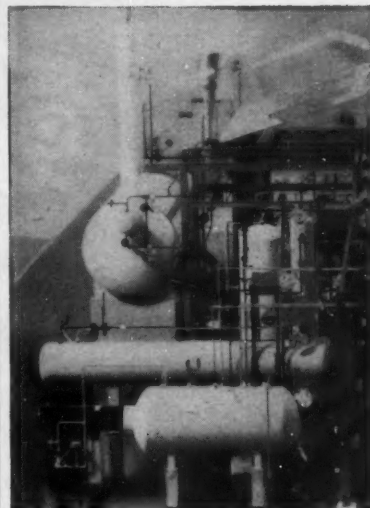
is available in transparent, opaque and colored forms.

Properties that make PVC windows promising for use in schools and industrial plants include resistance to weather, impact, oils and greases, fire, corrosion by acids.



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Whether you choose Pritchard as a major contractor or for specialized processes, you can be sure of this: no installation, large or small, fails to receive an extra measure of ability and cooperation from Pritchard personnel. The dry ice plant, model of which is illustrated above, is a typical example of Pritchard's specialized ability.

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It might as well have been cash
—If I know the "super"

My boss likes to dramatize things. He won his last argument with the superintendent by hitting him where it hurts most ... in his budget.

We work for a feed manufacturer. I'm a chemist. The boss is mixing foreman. We're blending a small amount of vitamin supplement with bulk feed. That's it—the boss claims we're wasting most of it through improper mixing. The "Super" wouldn't approve his request for a Simpson Mix-Muller—until yesterday, anyway. Seems the boss attended our meeting armed with a bucketful of Vitamin A supplement ... about \$38.50 worth ("Super" claims it's gold). At the proper time, he told the assembled "brass" that the bucket contained enough vitamin supplement to help fatten a whole herd of cattle—but for all the good it's doing us—and at the rate we're using it, he may as well heave it out the window ... and he did, bucket and all.

Guess it got their attention for his arguments on how the Mix-Muller is the only mixer specifically designed to give a thorough blend of dissimilar and disproportionate materials. Anyway we ordered the mixer today—and a new bucket.

If you mix dry or semi-solid materials we'd like to show you why and how Simpson Mulling can do a better, faster and truly more thorough blending job. Write for our handbook, "Mulling in the Chemical & Process Industries," today and remember ...

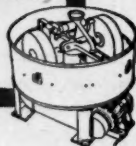


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MARKETS

moving strongly into the synthetic fiber field and into color finishes for automobiles. These inroads helped jack up production figures for moly pigments in '55 to some 31% over '54.

Use of organic molybdenum-type toners is also increasing, but at a less spectacular pace. Here again, molybdenum is cutting in on the sales of an entrenched competitor, tungsten. Reasons: smaller amounts of the former are required, and, more significantly, moly-derived toners are less expensive.

An interesting development has been the formulation of a group of toners that use both moly and tungsten derivatives. When used alone, an important drawback is that each is said to be relatively unstable after prolonged exposure to light—moly toner darkens; the tungsten type fades. Toners and pigments that combine both elements in their composition reportedly have far superior lightfastness. Further improvements in these combined pigments may well boost molybdenum use in this field.

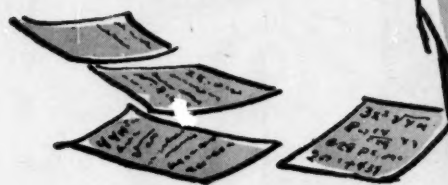
Catalytic 'Big-Timer': Molybdenum compounds are among the most widely used catalysts in industry. This year, over 560,000 lbs. of contained moly will be consumed in the U.S. as catalysts, more than doubling the amount used four years ago. Major consumer of moly catalysts is the petroleum refining industry. The products are used, for example, to improve octane rating of gasoline and for desulfurizing crude oil. Since 1950, several desulfurization plants, designed to employ molybdenum catalysts, have been built by the oil industry.

In the chemical industry, too, molybdenum catalysts have become important in the production of synthetic organics.

All told, expansion of present uses and fruition of newer outlets will likely boost annual moly catalyst consumption to almost 1.7 million lbs. of contained metal within the next decade.

To sum up, it can be said that the largest U.S. markets for moly chemicals today—in pigments and catalysts—will undoubtedly continue to grow. But by 1966, they may well take a back seat to agriculture and lubricant application. The switch, however, presages achievement of "big time" status for molybdenum chemicals.

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Market Newsletter

CHEMICAL WEEK

November 3, 1956

Domestic copper prices took a double-barrelled beating last week.

First, custom smelters whacked another 2¢/lb. off their material (a repeat of the previous week's action) bringing the smelter price to U. S. consumers down to 35¢/lb. Then, late in the week, producers made their move, as had been predicted (*CW Market Newsletter*, Oct. 27).

Phelps Dodge led the way with a 4¢/lb. slash, and by now 36¢ is industry standard for producers' metal.

Further substantiating the trade's pessimistic anticipation of fourth-quarter demand is Phelps' decision to cut its production of copper by about 7½%, and Anaconda's subsequent announcement that it would curtail output by eliminating overtime. This will slow each company's output by approximately 2,000 tons/month.

•

And, as expected, copper chemicals are being affected by the metal's drop.

Copper sulfate schedules have already been revised downward. Crystal material (in c.l. quantities) has slipped by \$1.30/cwt.—the first reduction since mid-July—to a new level of \$13.90/cwt., while tribasic sulfate is down \$2.65/cwt. (to an even \$30/ton.)

Industrial demand for the sulfate has been—and is—fairly strong, but agricultural calls have been seasonally slow. The latter use is expected to pick up from here on in, but supplies are adequate to satisfy any inquiry.

As of now, there's no official announcement that other copper chemical prices will go down, but chances are they will—this week or next. Why? Most makers have simply been waiting to see how far copper prices would drop.

•

Pesticide makers have this good news from the Food & Drug Administration: there's no need for a tolerance limit on four widely used liquid fumigants—carbon bisulfide, carbon tetrachloride, ethylene dibromide, and ethylene dichloride (see also p. 53).

A cooperative industry-FDA-U.S. Dept. of Agriculture study shows no residue of these compounds in cooked, milled grain products nor in milk from cattle ingesting the chemicals in feed grains. Results of the study were disclosed at last week's 70th annual meeting of the Assn. of Official Agricultural Chemists.

•

Also of interest in agricultural circles is the prediction that domestic castor oil may be selling at an unfluctuating 16¢/lb. Reasons for the rosy prognostication: development of effective mechanical harvesters to work with a new hybrid castor bean developed by USDA and two California companies, Pacific Vegetable Oil Corp. and Pacific Oilseeds, Inc.

Market Newsletter

(Continued)

Until now, the vegetable oil industry (and sebacic acid and surface coating producers) have been dependent for much of their castor oil requirements on unsteady foreign imports (e.g., 95% of U.S. consumption of 60,000 tons last year was imported).

The harvesters and the new bean could mean an economically planted, grown and harvested U.S. crop and, more important, an assured castor oil supply.

Incidentally, higher cost of imported castor beans—some sellers are holding out for as much as \$15/ton more than previous quotes—and higher-priced imported castor oil are behind this week's boost of 1¢/lb. in domestic grades of the oil. USP material in drums (c.l.), for example, is up to 24¢/lb.

More anent the government-owned alcohol-butadiene plant at Louisville (see *Washington Angles*, p. 25): Publicker, the present lessee (until April '58), has formally notified the Federal Facilities Corp. that it is shutting down production. Immediate effect of the move—permitted under the lease arrangement—is to shift cost of maintenance of the plant from the company to the government.

You can hear in the trade many reasons why Publicker is stepping out of alcohol-butadiene production. Perhaps most valid is this: the company started such operations (*CW Market Newsletter*, Dec. 17, '55) to fill the gap between over-all butadiene demand and supply of lower-cost petroleum-derived material; now there's enough of the latter available, especially since sales to the synthetic rubber industry haven't maintained earlier anticipated levels.

Question being bruited about Washington again is whether or not this "insurance" quality attached to the Louisville installation is worth the cost of maintaining the plant in stand-by condition. The answer is due soon.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending October 29, 1956

UP

	Change	New Price
Dihydrostreptomycin hydrochloride, bulk, gram	\$0.005	\$0.075
Streptomycin hydrochloride, bulk, gram	0.005	0.075
Castor oil, dom., USP, c.l.	0.01	0.24

DOWN

Copper sulfate, cryst., 99%, bgs., c.l., works, cwt.	\$1.30	\$13.90
Copper sulfate, tribasic, bgs., c.l., works, cwt.	2.65	30.00

All prices per pound unless quantity is stated.



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Pro

- Preservative treatment enhances wood's resistance to decay
- Treatment permits use of less-expensive fir in place of redwood
- Treated wood has stood up well over a period of years

Con

- Treating compounds are leached out of wood by cooling water
- Treatment is expensive, puts treated fir into redwood price range
- Test periods to date are too short to provide conclusive results

Cooling Towers Spark a Hot Fight

There's a battle royal shaping up among makers of cooling towers concerning the desirability of treating the wood used in making the towers—and the chemical process industries have a gigantic stake in the outcome.

Interest in the subject is not hard to find. Three of the CPI's thirstiest members (chemical, petroleum, pulp and paper) consume 6 trillion gal. yearly (*CW*, March 26, '55, p. 78). And over half of this water goes into establishments that recirculate more than 5% of their intake. That means the industry sends at least 30 trillion gal. through cooling towers every year.

Room for Dispute: The current controversy centers around methods of reducing chemical and biological deterioration—the scourge of industrial cooling systems. Tower suppliers and redwood lumber producers have pooled their resources at the Cooling Tower Institute (Palo Alto, Calif.) where diagnosis and treatment have been studied since 1951. But as the latest report (CTI bulletin WMS-104) points out, interim reports are not necessarily conclusive. Thorough testing may take 20 years.

Until the tests are completed, treatment of cooling-tower wood will likely

be decided on economic grounds. For, though the value of wood treatment is well known, it can add from 7 to 15% to the cost of the tower, depending on the type of treatment. And since the preservative is leached out of the wood in time by the constant flow of cooling water, users must weigh the cost of treatment against additional cooling tower life that is to be gained.

It's in this area, the value of treatment in extending service life, that the tower manufacturers disagree. Some, like Fluor Products Co. (Whittier, Calif.), feel that treatment is justified only in special circumstances—and then only for those parts of the tower where rot might be a major problem—e.g., just above the eliminators where there is a constant humid atmosphere. Others, like J. F. Pritchard & Co. (Kansas City, Mo.), recommend general use of tower preservatives in the Gulf Coast area where decay is particularly prevalent.

The Marley Co. (Kansas City, Mo.) claims that no geographic area is immune, is convinced of the value of treatment in any case. Its answer to higher tower costs: substitution of less-expensive Douglas fir for redwood in new tower construction.

Knotty Problem: Hitherto, redwood has been preferred because of certain advantages over other woods—clear grades (only heartwood with no knots), relative freedom from distortion with changes in moisture content, inherent resistance to decay due to its highly toxic extractives. Marley declares that treated fir is as good as redwood where rot-resistance is concerned, and that fir is stronger, too.

And though Marley admits that treated fir towers cost slightly more than those of untreated redwood, it offers both types at the same price. Marley isn't going into reasons. But, as the largest maker of cooling towers, it sometimes cannot get enough redwood to fill all orders.

Unsettled Reasons: Just why rapid redwood deterioration has become a scourge in recent years is not completely clear. One explanation is that mechanical draft towers came into their own during World War II, bringing with them the uniform, steady atmospheric conditions that encourage biological activity.

But there are other possible causes. Biological attack is not new, say some; it's only the great increase in the number of cooling towers that has

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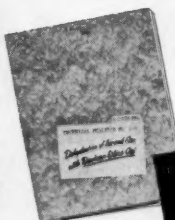
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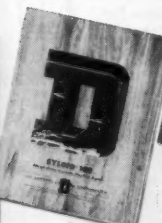
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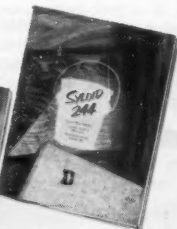
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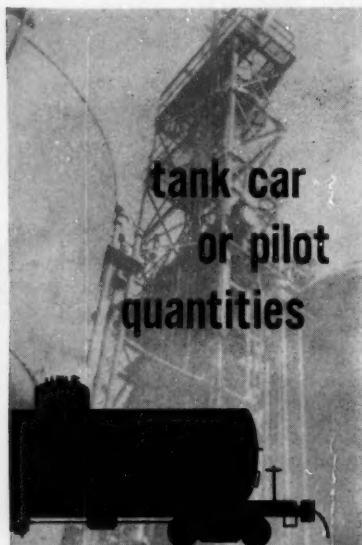
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PRODUCTION

converted the still relatively low percentage of cases into a significant number. A third explanation turns to the material of construction, presumes that second-growth redwood being used now is not so resistant to biological attack. But Pritchard, for one, disputes this explanation, says virgin timber is still used almost exclusively.

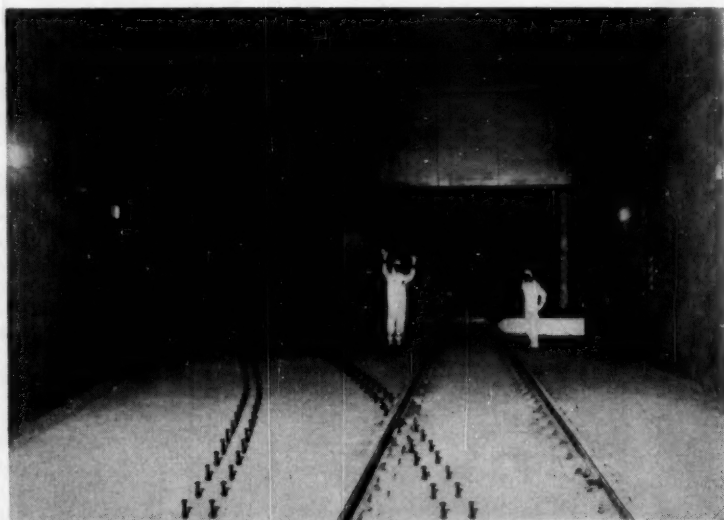
Chemical Attack: The fourth explanation that, many agree, has much to do with deterioration is chemical attack, which makes the wood more susceptible to biological attack. Improper water treatment—i.e., treatment based on the requirements of the entire system rather than on those of the cooling tower—is believed to be the greatest offender on this score. And although wood preservatives will not prevent chemical attack, different water treatment methods will. Chlorine residuals should be kept below 1 ppm., carbonates below 100 ppm. and pH under 7.5.

Biological Attack: Fungi are be-

lieved to be the main cause of biological attack. None of the bacteria checked thus far has been able to utilize cellulose (a major cause of decay) as the sole source of carbon, according to Cooling Tower Institute bulletins. Both flooded and nonflooded portions of the tower are susceptible. And unlike chemical attack, which appears to be confined to the wood surface, the fungi also penetrate the wood, cause brashness or brittleness.

Of the many types of treatment available, two—creosote and greensalt (chromated copper arsenate)—seem to rate highest with cooling tower makers. Creosote treating is a standard and well-known practice. But creosote is injurious to the skin, must be handled with great care during application. This adds to the cost, makes creosote about 50% more expensive than greensalt treatment.

Greensalt has also been used as a wood preservative for many years. It is the basic ingredient of Koppers'



End of the Line for 'Hot' Equipment

WITH ARMS RAISED in the railroaders' traditional "come ahead" signal, protective-suited worker at AEC's Hanford, Wash., atomic plant beckons a load of radioactive freight down a 500-ft. track running dead-end into a concrete-lined burial tunnel. The spur provides safe storage for worn-out atomic concentrators,

other bulky apparatus that's too radioactive to be repaired. Once inside, the flatcar and its 'hot' cargo will be entombed forever behind a massive water-filled radiation barrier gate. When the tunnel is filled to its 12-railway-car capacity, tracks will be diverted to a second underground vault (at left in photo).

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3

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4

Shipping facilities. Fleets of tank cars and tank trucks are ready to deliver Anhydrous Ammonia, Aqua Ammonia and Nitrogen Solutions to you. Plant-side trackage permits positioning cars for immediate filling and shipment of *your* order.

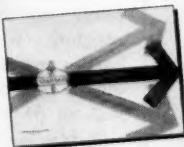
5

Simplified ordering. As a Midwest manufacturer, chances are you are already a Standard Oil customer for fuels and lubricants. You may thus have an established purchasing continuity with Standard. You may order Anhydrous Ammonia, Aqua Ammonia and Nitrogen Solutions just as easily as you order your petroleum products—and in the same way. Call your nearby Standard Oil office. Teletype facilities or direct phone line will be used to start *your* order moving.

6

Designed to fit every need. Standard offers four Nitrogen Solutions, both Commercial and Refrigeration grade Anhydrous Ammonia and Aqua Ammonia. Nitrogen Solutions are:

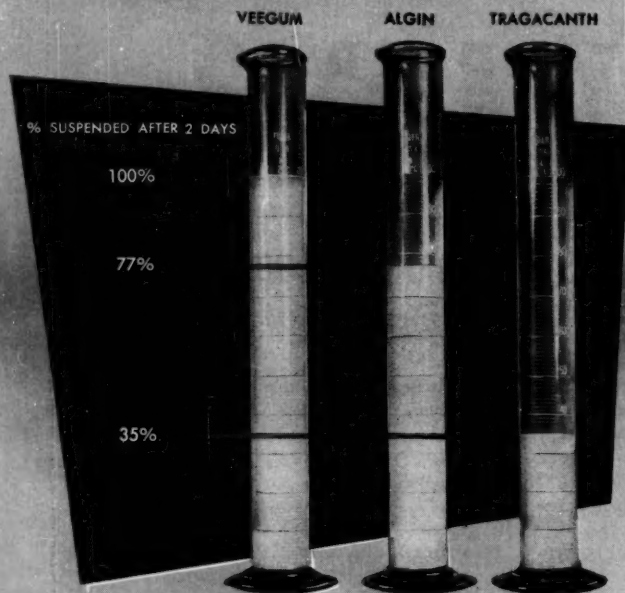
Nitrogen Solution 410A	(41.0% total nitrogen)
Nitrogen Solution 410B	(41.0% total nitrogen)
Nitrogen Solution 370	(37.0% total nitrogen)
Nitrogen Solution 490	(49.0% total nitrogen)



Find out more about the advantages of ordering Standard Anhydrous Ammonia, Aqua Ammonia and Nitrogen Solutions. Get a copy of this new booklet describing the full line of nitrogen products. In the Midwest, call your nearby Standard Oil office. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

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The test — a comparison between the suspending ability of Veegum and commonly used organic agents. **The method** — 4 g of talc (R. T. Vanderbilt Co. Nylal 300) were suspended in 100cc each of aqueous dispersions of Veegum and organic gums at 65 centipoises. All suspensions were given 2 days to settle. **The results** — Veegum held from 28% to 300% more talc suspended than any organic gum tested. Similar results were obtained with pyrophyllite, clay, colloidal sulphur and such organic compounds as DDT.

VEEGUM is purified colloidal magnesium aluminum silicate. Thixotropic properties and a tendency to thicken slightly with heat account, in part, for its superior suspending and emulsifying qualities. In water systems, Veegum disperses hydrophobic materials without lowering surface tension. Less than 1% Veegum permanently stabilizes emulsions of many types of oils, fats and waxes. Aqueous dispersions of Veegum are compatible with alcohols, polyglycols and other organic solvents, and certain electrolytes. Try Veegum in your own laboratory*. It will give you higher solids suspensions at lower viscosities with improved stability, texture and consistency. Easily-prepared Veegum is non-toxic, nonirritating, opaque, white, odorless and tasteless.

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PRODUCTION

Marlith (used for treating Marley's fir) and Erdalith processes. A solution of copper sulfate, potassium dichromate and arsenic acid, Greensalt combines with wood sugars to precipitate metallic chromates and hydroxides. The solution is applied under hydraulic pressure of 100 psig. for 12-24 hours to force the solution into the wood before the tower is fabricated, adds about 10% to tower cost.

Double Diffusion: Treatment of towers already in operation poses a more difficult problem. For the necessary penetration, a solution must be applied under pressure. Only method felt to have practical value is the double diffusion treatment developed by R. H. Baechler of the Dept. of Agriculture's Forest Products Laboratory (Madison, Wis.). Two solutions (usually copper sulfate-arsenous acid, followed by sodium chromate) are sprayed onto the tower under about 100-psi. pressure.

While many are skeptical of double diffusion's ability to resist leaching, accelerated aging tests run under a cooperative program by Forest Products and Marley show no greater tendency to leach than greensalt treatment of new wood. Greatest problem would appear to be treatment at tower joints since nothing is dismantled during spray application.

And though Marley has recommended double diffusion since 1951 (treatment can be carried out by the tower owner), the story is the same as with pressure treatment of new wood. Full judgment can't be passed until years of actual tower testing have been completed. Thus far, towers have racked up only a little over four years of service after double diffusion treatment.

Other Materials: While emphasis remains on wood, tower makers are quietly testing other materials that may lick deterioration. Plastic filling sounds like a good bet, but it's much too expensive. Metals, like aluminum and steel, are being tried. In fact, steel towers are in use where special fireproofing is a must. And in cases where harsh chemicals are found in the cooling water, concrete spray-type towers without packing are sometimes used.

But as of today, consensus is that redwood will continue to be the best construction material for many years to come, and treatment will be needed only for problem cases.



This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

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Pellets can be shipped in 100-lb. waterproof bags, or dry in bulk — in hopper cars or tank cars. When shipped dry in tank cars, they can be unloaded by merely pumping in water and pumping out concentrated calcium chloride solution. When shipped dry in hopper cars, they can be unloaded from the bottom and mechanically conveyed to tank trucks and storage facilities. Stored in bulk — in convenient silos — pellets maintain their normal free-flowing characteristics.

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Pluronic grades particularly suited to this application include: L42, L43, L62D, L63D. The Pluronics may be used full strength, or diluted with water or alcohol, depending upon the type of injection device employed. The most satisfactory results are obtained when the concentration of Pluronic in the final rinse is 60-100 ppm.

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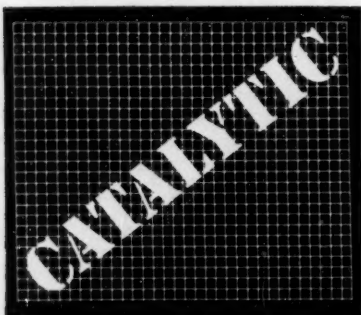
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PRODUCTION



ASA PARLEY: Chemical planners* outline a new program for . . .

Streamlining Standards

New machinery for speeding the chemical process industry's standardization program held the spotlight at New York's Hotel Roosevelt last week as the American Standards Assn. played host to several hundred representatives from its 113 trade association and technical society members and its more than 2,200 individual company members. Occasion: the seventh annual conference on standards, held in conjunction with the 38th annual meeting of ASA.

Typical of the cooperative participation by single industry groups is the proposed establishment of a new committee to coordinate standardization activities of the chemical process industries. At present, the clearing house for chemical industry standards is the Chemical Industry Advisory Board, which was organized in 1950 by the Manufacturing Chemists' Assn. But CIAB is strictly an advisory group, in which capacity it neither writes nor supervises the writing of chemical industry standards.

To expand its present scope of activities, CIAB proposes to set up a full-fledged standards board—the Chemical Industry Standards Board—which would be empowered to supervise chemical product standardization. All that's needed now to win ASA's approval of the plan is proof that MCA and a preponderance of other

CIAB members favor the change, that the proposed board is properly constituted to handle its extended responsibilities.

CIAB Chairman J. G. Henderson of Carbide and Carbon Chemicals Co. reported that, despite a natural reluctance on the part of chemical industry management to promote standardization of its products, a substantial segment of specific product standardization does come to ASA. It's expected that the proposed CISB will further narrow the gap between ASA and chemical industry management, as has the mechanical technical committee recently organized under MCA's executive committee.

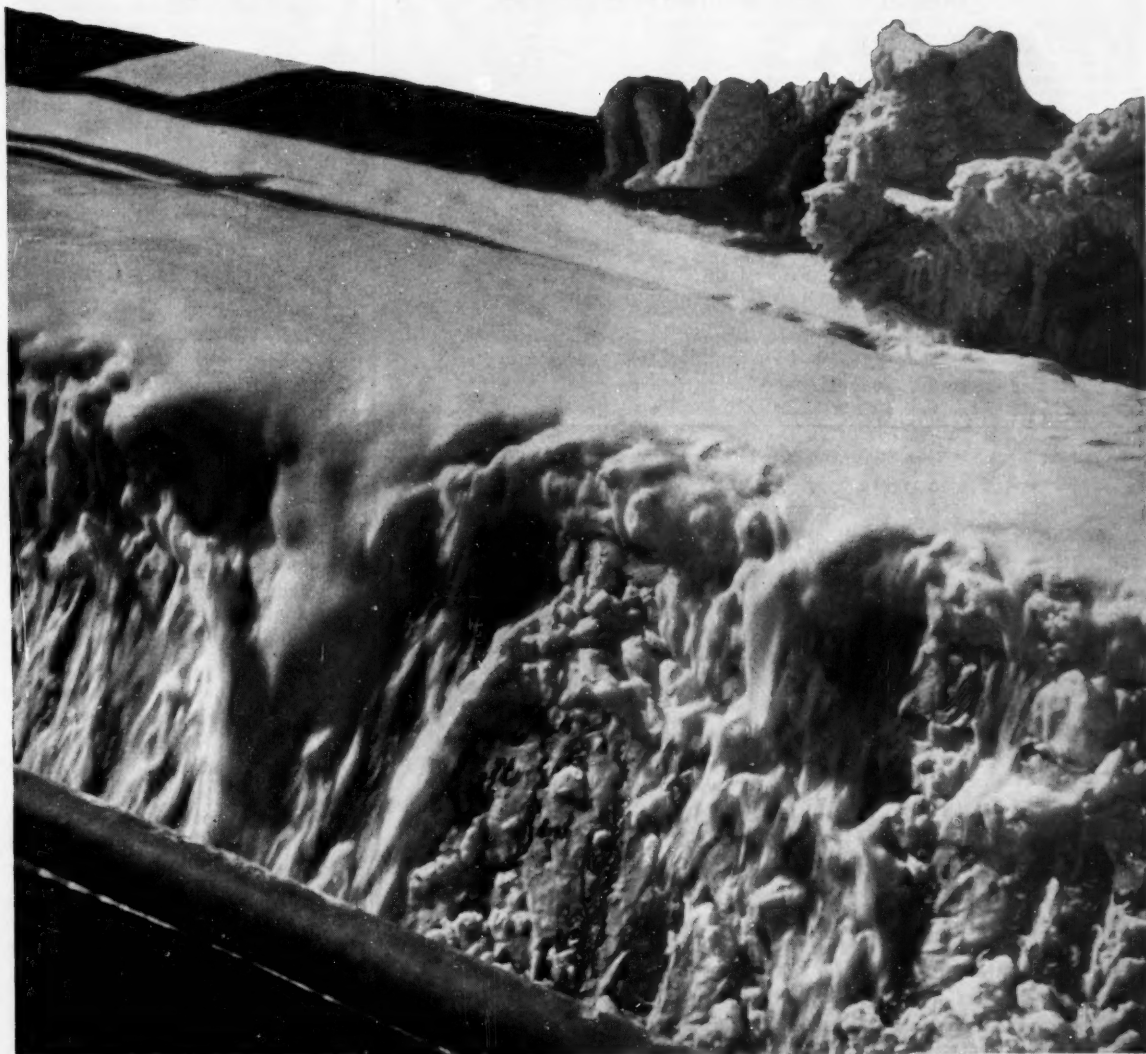
Nuts-and-Bolts Savings: Highlighting the mutual benefits of standardization, David Pierce, director of manufacturing control at Diamond Alkali, reported that adequate company standards can provide substantial savings on small items, as well as on major equipment components. For example, Diamond's purchasing department saved more than 6% by getting bolts with rolled, rather than cut, threads; saving of 5-10% can sometimes be made by purchasing bolts from one firm, nuts from another.

Convinced that standards are worthwhile, Diamond looks hopefully toward the time when it can replace tailor-made processing units with standard, off-the-shelf items. And, though such equipment as heat ex-

*Left to right: Duriron's Staley; Carbide and Carbon Chemicals' Henderson; Diamond Alkali's Pierce; Monsanto's W. M. Cooper.

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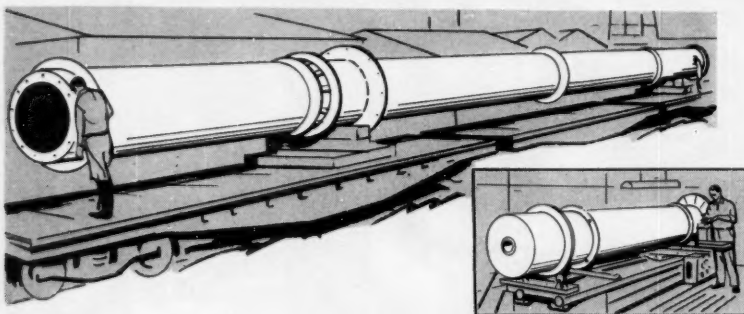
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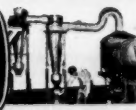
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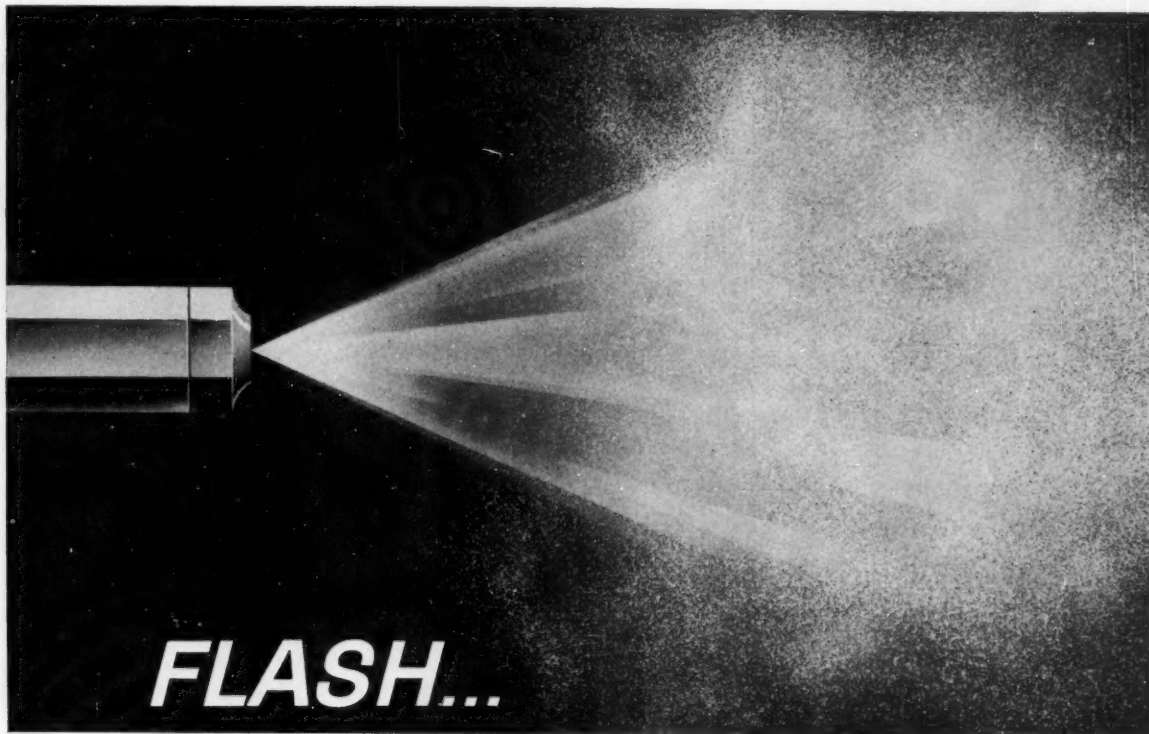
changers and pumps are still in a transition stage, the company has already put into effect a valve-standardization program that substitutes commercial valves at \$66 each for non-standard, homemade valves costing as much as \$224.

Looking at valve standardization from another viewpoint, W. D. Staley, vice-president in charge of sales for Duriron Co., listed several advantages that accrue to the manufacturer. Standards such as the face-to-face dimension on valves reduce the number of "specials" that must be made to order, permit longer production runs, better shop scheduling, economical parts inventory and more realistic delivery promises.

Nuclear Entry: The closing session of the conference on Wednesday marked the initial discussion of atomic energy standards at a national ASA parley. Sizing up the tremendous standardization task that lies ahead of the burgeoning nuclear industry, Vice-Admiral Willard A. Kitts, 3rd, USN (ret.), chairman of the Atomic Industrial Forum's committee on standards, pointed out that this new field of science "crosses all other fields, but is completely encompassed by none."

Despite the complexity of the nuclear industry, there are two big factors working in favor of atomic energy standards. One is the industry's youth—still in a transition stage, atomic energy isn't encumbered by a multiplicity of arbitrary standards. Another advantage is the objectivity with which early atomic standards were established. Because atomic energy was a government monopoly at the start, early planners were not hampered by obsolete construction and building codes, were free to make ground rules solely on the basis of scientific and engineering data.

The present goals for nuclear standardization: revision of, or additions to, existing codes (e.g., piping, pressure vessel construction, etc.) where applicable; establishment of new standards to cover those problems unique to atomic energy facilities. The Nuclear Standards Board has already formulated its policies for accomplishing these vital tasks. And with the wholehearted support of ASA, atomic energy standards stand a good chance of keeping pace with the industry's rapid technological growth.



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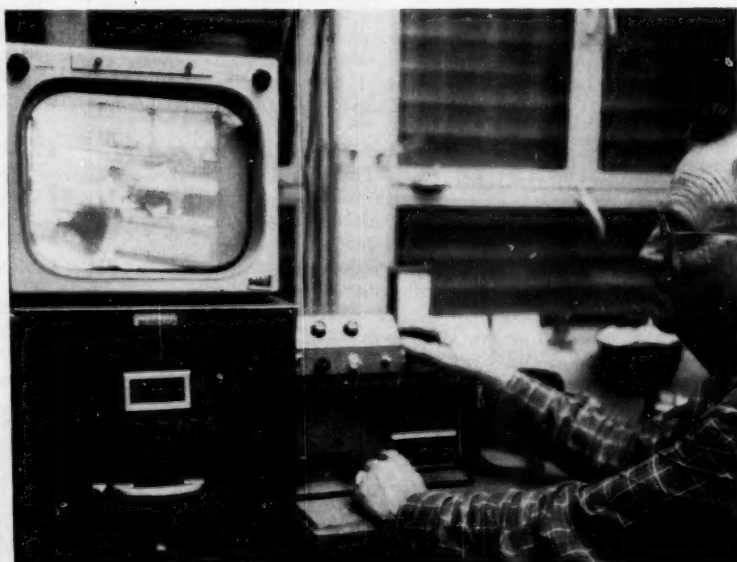


TV Tends the Gate

YOU WON'T WIN \$64,000 on the TV quiz at Ethyl-Dow Chemical Co.'s (Freeport, Tex.) No. 7 gatehouse (above). But if your answers are correct, the electronic gatekeeper will admit you to the plant.

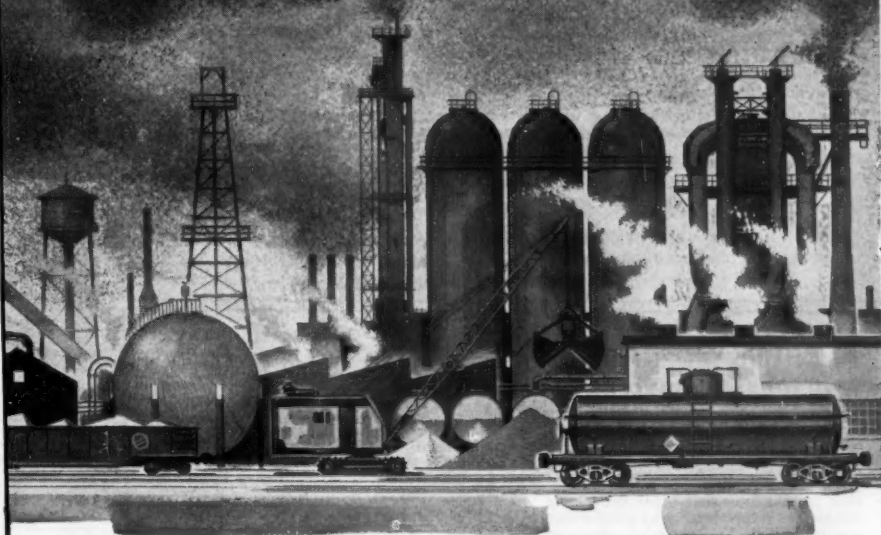
The closed-circuit TV system was installed by Industrial Television, Inc.

(Houston, Tex.) as a part of Ethyl-Dow's plant protection system. On duty after 4 p.m., the TV camera and microphone serve as eyes and ears for the patrolman (below) hundreds of yards away in the plant's main office. Remote control of the unit permits panoramic viewing of the gate area.



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Conveyor Drive: The American Pulley Co. (Philadelphia) is out with a new speed-reduction unit for screw conveyors. Flange adaptor permits bolting the unit directly to trough end of conveyor; direct drive shaft for screw conveyor eliminates need for separate drive-end shaft. The unit will drive conveyors having angles up to 20 degrees above or below horizontal. Three sizes from ½ to 10 hp., with reduction ratios of 5:1, 13:1 and 20:1, provide conveyor speeds ranging from 15 to 290 rpm.

Proportioning Pump: The new Microflex chemical proportioning pump of The American Instrument Co., Inc. (Silver Spring, Md.) displaces the entire contents of the pump cylinder with each stroke, regardless of stroke adjustment. The pump is available in a number of pressures and capacities—maximums are 60,000 psi. and 31.21 gal./hour. Stroke adjustments can be made while pump is operating.

Fine Filtration: Its new MF Sub-micron Filter removes suspended particles larger than 0.45 microns from water at high flow rates, says Barnstead Still & Demineralizer Co. (Boston, Mass.). Operating pressure drop across one of the clean, cellulose-ester filter discs is less than 0.3 psi. at flow rates of 100 gal./hour. Filters are made with capacities from 100 to 400 gal./hour.

Ultrasonic Transducers: Vibro-Ceramics Division, Gulton Industries, Inc. (Metuchen, N.J.), offers a new series of transducers for ultrasonic cleaning and processing applications. Called Glennite Series UT-10, they have power ratings to 250 watts, operate on frequencies of 22 or 55 kc. at temperatures to 155 F., use ordinary solvents, detergents, mild acids and alkalis. Sizes: ½- or 1-qt. capacity.

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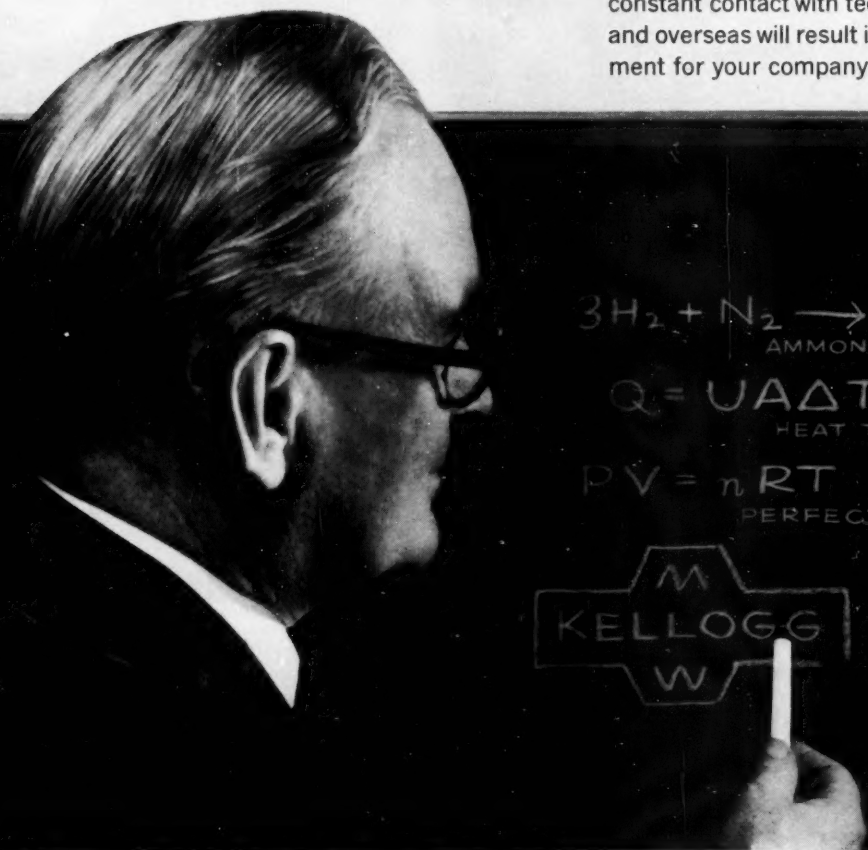
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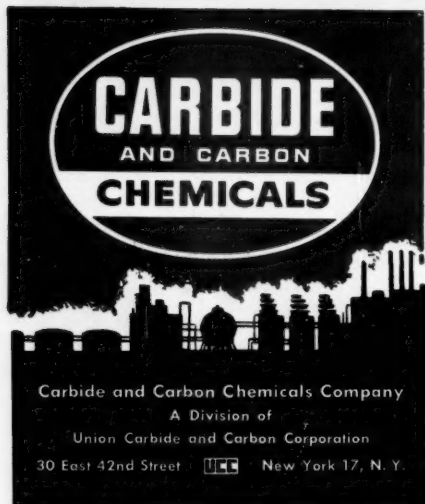
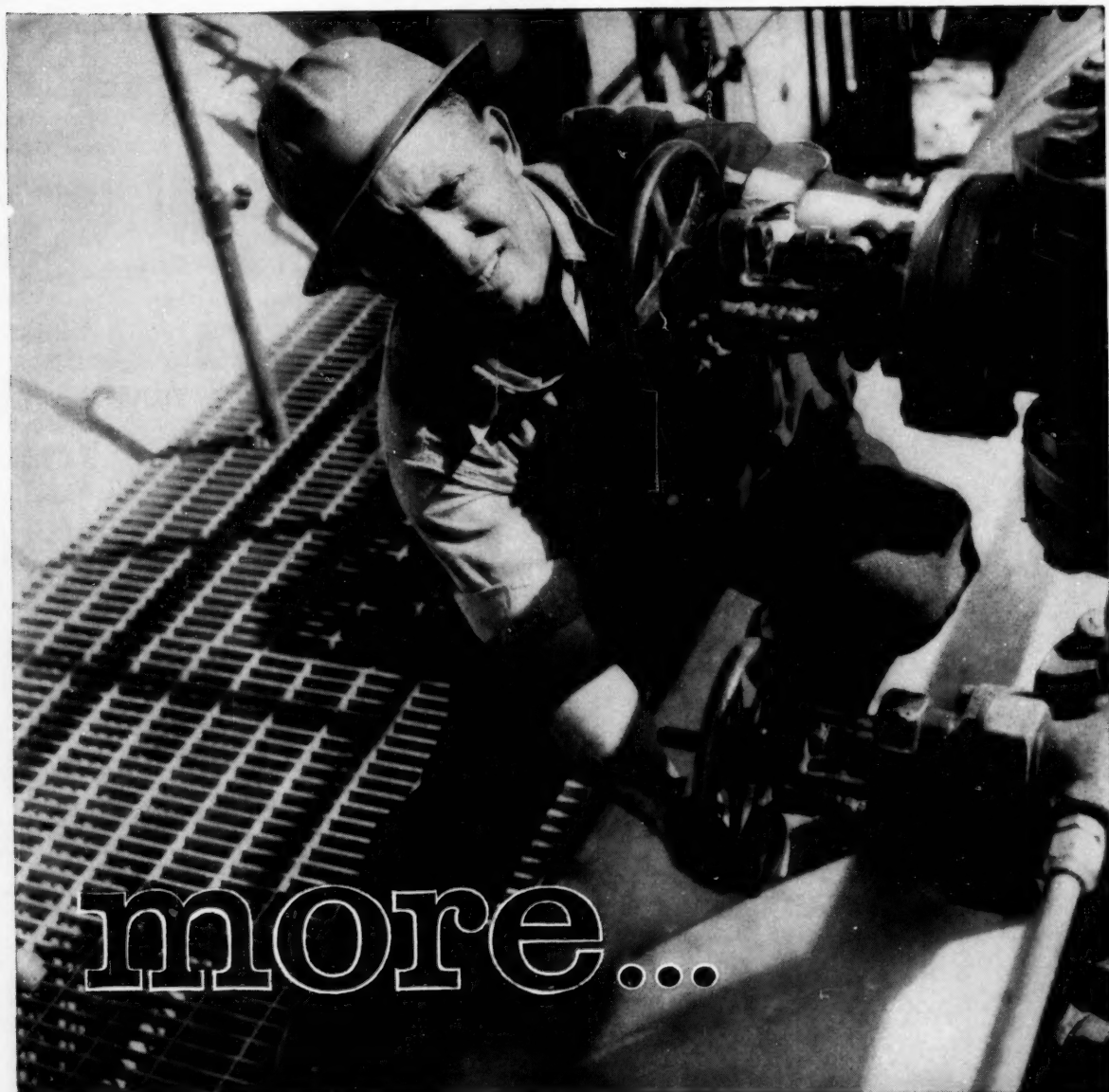
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